

PACKAGING OF FOOD &
BEVERAGES

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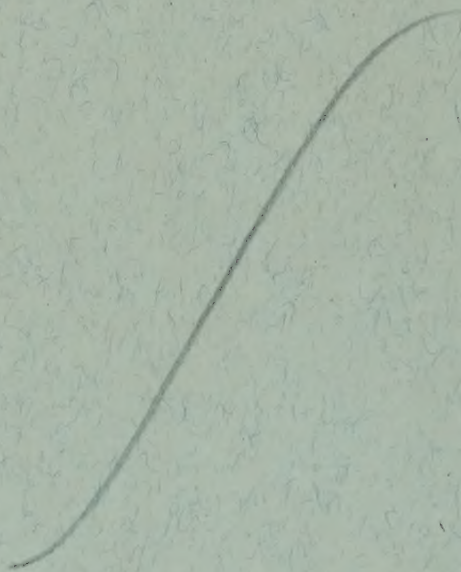
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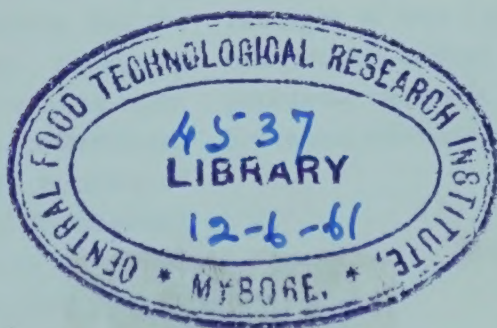
THE PACKAGING OF FOOD AND BEVERAGES

*(Packing and Packaging, Materials, Methods and Machinery
for Filling, Sealing, Labelling and Displaying Food Products)*

*A concise up-to-date book of papers, board materials, food containers, cartons, boxes,
bags, tubes, bottles in all materials, display outers and aids to selling, design, colour,
appeal, novelty, after-use of container and visibility appeal of the pack. Wrappings, foils
and films, etc., for the packager of food, beverages and allied products*

by

FREDERICK T. DAY



LONDON

Trade Journals Ltd.

1960

ACKNOWLEDGMENTS

The author wishes to place on record his sincere thanks to the many Trade Associations, friends and packaging material manufacturers who have given permission to reproduce tables, descriptions of materials and methods and their application in both packaging and packing. Current photographs of products and machinery are also reproduced with the courtesy of packaging machinery specialists. The latest illustrations of sealing and labelling machinery for bulk and product packaging and other current materials are also acknowledged to Messrs. Bowater, Reed, Venesta, Dickinson, British Cellophane Ltd., Soag Machine Tools Ltd., Imperial Chemical Industries, Samuel Jones & Co., Ltd., The Metal Box Co., Ltd. and the trade magazine 'Paper Packs'.

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FOREWORD

THE modern package has acquired many duties and responsibilities and a successful package must meet them all—protection, sales appeal, ease of opening, economy, to mention some. Nevertheless, it remains true that in many foodstuffs protection is still one of the vital needs and changes in packaging medium must keep this need to the forefront of all other considerations.

Protection is itself not a straightforward problem, the success of each package depending on factors peculiar to it. Packages must, for instance, keep cheese moist and biscuits crisp, retain flavours, keep out other flavours and at the same time ensure that no off-flavours are imparted by the packaging material and so on.

Great ranges of temperature in storage conditions or long shelf life demand a standard of protection higher than normal, packages at home normally being capable of being sold with less protection than those going overseas. In products where protection comes first, the next function is probably sales appeal bearing directly on the better presentation of products for both home and overseas markets. In some products, of course, sales appeal can be the prime factor. With the ever-changing pattern of distribution methods, the carefully designed package has been accepted as a powerful aid to selling.

There are many factors to be taken into account in considering the choice of package and only close investigation can produce the information by which the pitfalls may be avoided and economies made. Some of these factors include the reduction of damage in transit, the speed and ease of filling, the saving of space (this is particularly important in relation to transport costs, both home and overseas) and last one comes back again to the appeal to the customer both as to attractiveness and convenience of opening.

New methods and materials for packaging are constantly coming forward, without necessarily replacing the well-tried packaging methods of the past. The many specialist packaging exhibitions throughout the world illustrate the steady growth of the packaging industry and the great range of possibilities for the industries which use packaging.

F. J. LAWTON,

*Director and General Secretary,
Food Manufacturers' Federation
Incorporated.*

OTHER BOOKS BY THE AUTHOR

Published by Trade Journals Ltd.:

- 'Paper & Printing Manual'
- 'Paper Converting & Usage'
- 'Paper & Board Conversion'
- 'A.B.C. Index of Papers & Boards'

Published by Newnes Educational Publishing Co.:

- 'Coloured Paper Craft'
- 'Coloured Paper for Schools'
- 'Paper Sculpture'
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Published by C. Arthur Pearson Ltd.:

- 'Decorative Flower and Leaf Making'
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- 'Gummed Strip and Paper Modelling'
- 'Colour Paper Decoration'

PREFACE

FOOD packagers have the widest range of products to package, the container being made from almost every kind of basic material. Both unit and bulk packaging and packing come into the display marketing scheme in this important field of industry.

Good packaging means the use of the best materials and a thorough knowledge of their application and possibilities, as only the highest grade of material should be used for food presentation. The aim of this book, therefore, is to emphasize the importance of these essentials. Wrappings, packaging materials, protective barriers, new gift packaging papers, label design, pack styling and re-styling, colour and its application and appeal, the various methods of enclosing and sealing packages and cases, all are included and afford a source of reliable information upon which the packager may call and work into the scheme of first class packaging and carry forward for fuller information from the specialist concerned.

An index of wrappings, films, foils, laminates, paper surface treatment, novelty, visibility of pack both at home and overseas with some notes on printing processes will be found to be of special value to packagers of foodstuffs with an ever expanding market.

Labelling for cold and hot climates where goods are exported, deep freeze conditions of packaging and labelling, new protective kraft wrappings, sealing machinery, all have a very definite value and the information provided is the latest possible. The fibreboard corrugated packing case and its application in packing and display are dealt with at some length as this form of bulk packing features largely in the despatch of foodstuffs for the home and overseas markets.

The latest materials and trends, vacuum forming and blister packaging, where they have an application, are discussed, together with a review of the latest types of food containers made from various kinds of basic materials. Plastic and coil tubes and containers, multi-wall paper sacks, bags and satchels, are among other important aspects of packaging dealt with. The value of pack visibility, hygienic materials and their current application are subjects of special interest to food packagers.

Food producers and packagers have always been rightly proud of their labels and new after-printing surface treatments to printed work is surveyed for the interest of those concerned with the production of the better and brighter package which stands in need of a waterproof and fingerproof label or box covering.

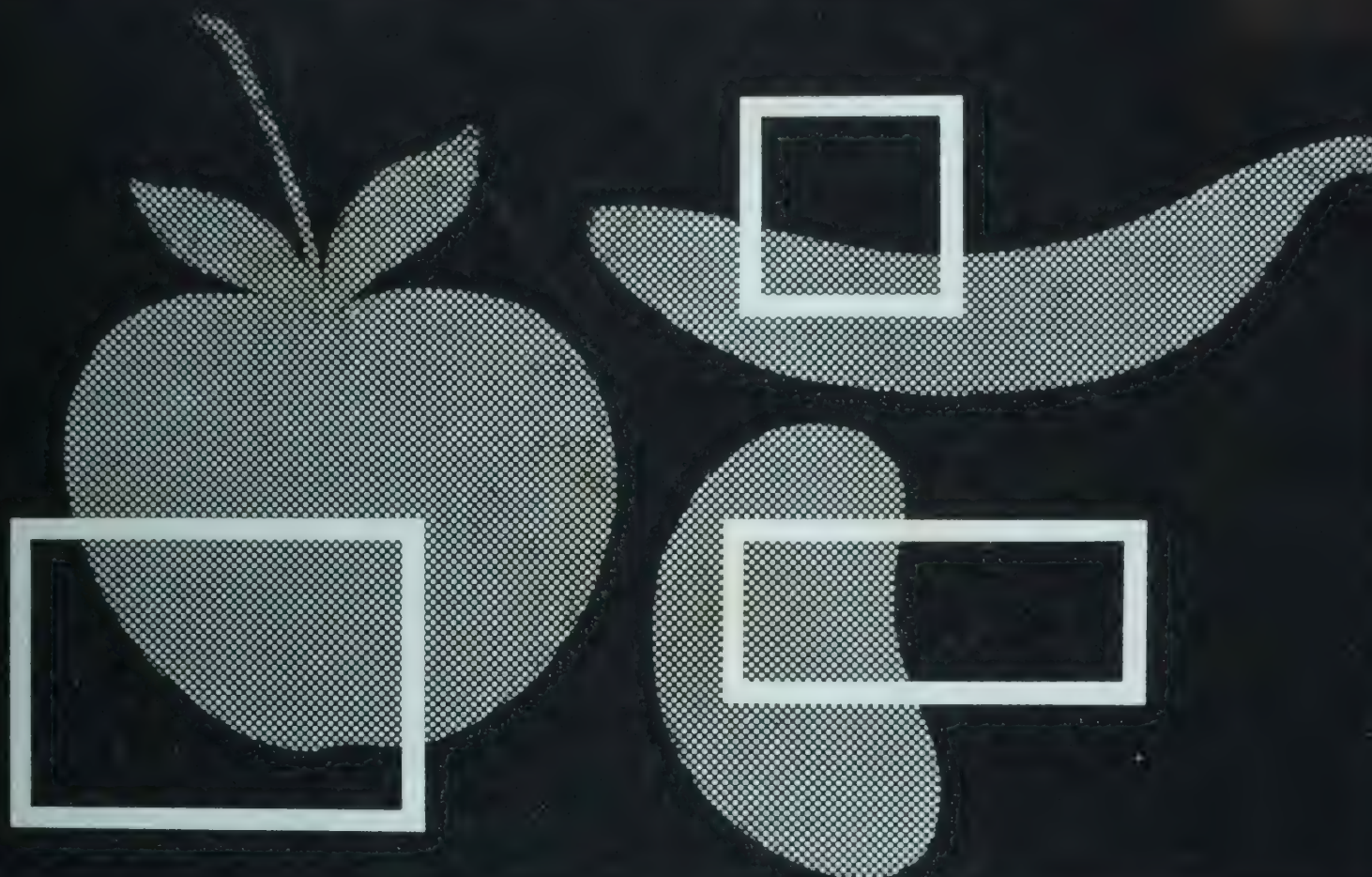
Paper and board materials feature very largely in this book. The author has had some 30 years' active experience as a paper consultant to various packaging trade bodies and has regularly contributed articles and surveys on home and overseas food packaging to all the leading trade journals at home and abroad.

The paper maker has made some outstanding contributions to packaging material supplies and further exchanges of ideas can help to formulate many new important protective barriers for food wrapping purposes. Progress is gained by a wider all-round knowledge of any subject and this can come from an exchange of ideas. All activities and progress associated with the great new and all important industry now called packaging have been developed to serve many other trades and purposes. It can however have its usefulness in all fields considerably extended by this all important exchange of ideas as a result of user co-operation.

FREDERICK T. DAY.

Bexleyheath, Kent, 1960.

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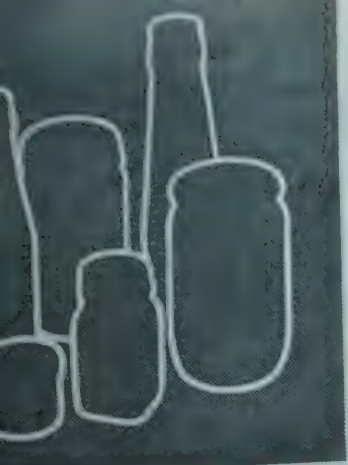
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CHAPTER 1

Food Containers

THE packaging industry has grown so rapidly that even current editions of the English dictionary have no special interpretation to place upon the word 'container', French in origin, other than to 'contain or hold something.' So far as this chapter is concerned, the word container includes all kinds of outer bulk packing cases and units, and most internal or unit packaging covers designed to hold liquids, powders, syrups and solids in a presentable and convenient form for retail distribution, including display and point of sale demonstration of the product. Food containers here will include a survey of various types of cans, all kinds of rigid and collapsible boxes, plain over-wrapped and printed cartons, composite containers, multi-wall paper sacks and bags, primary and secondary packages, satchels, glass containers, bottles and jars, waxed cartons, cups, fancy dishes and tubes, all of which have an application in the process of food filling and packaging. Some of these items are sufficiently important to warrant greater expansion of description relative to material used and their sales appeal, therefore certain food containers outlined in the list above, are treated at greater length in other chapters. At the same time, various kinds of wrappings have become so important in various food packaging projects, that the subject is dealt with separately.

This book is intended to be as comprehensive as is possible within the limits of space and, as has been pointed out in the author's preface, it is intended to lead the packager seeking new and current materials to make further enquiries and tests. With an ever developing industry such as packaging which continues to grow in relation to the needs and requirements of most other trades, both at home and overseas, it cannot be stressed too strongly and too often that initial consultation must always take place between the supplier and user of packaging materials of every kind to ensure that the latest and most useful and efficient materials are used. The packers too who use the materials must know of their uses and what they are capable of doing in their various fields of usage. An exchange of information always helps to gain knowledge whereby, very often new coated materials, shapes in containers, protective materials and barriers can be formulated and produced for the good of one or more industries.

Visible Packaging

One of the most outstanding advances in packaging in the food and allied industries is visible packaging which involves all kinds of filmic wrappings, plain, printed, coloured, fancy and embossed. To be able to see the contents of the package and yet have them fully protected from dust, damp, dirt,

light and heat (in certain circumstances) and to render the pack hygienic and eye appealing, is something of considerable importance in these days of display and sale via the self-service stores and the supermarket. Here, the goods are chosen often as a result of brand name, eye appeal and the initial impact of the package upon the buying public. It also affords the retailer a talking point right up to the point of sale as the goods may be partially examined and seen often without opening up the pack. In some sections of industry, polythene bags with zip openers, permit the product to be extracted, examined and replaced thus making the visible package ideal in every way. Small additional charges are made for the easy open zip closed bag which has a very definite after-use appeal. Such bags, printed with the packager's name, brand mark or trading slogan, are a constant reminder of the brand when further supplies are required.

The Visible Packaging of Flour Confectionery.—While filmic wrappings are dealt with in another chapter, some reference may be made here under the heading of food containers, as film virtually becomes a food container when used for the packaging of suitable products. Perishable and fragile food items which are not cooked after sale must be protected against loss of freshness, contamination by dust and flies, and the hazards of physical damage in the shop window or on the counter and even often on the way home. The suitably chosen film will do all this and more plus the advantage of visibility. It is this all-important combination of protection and eye appeal display value which helps to increase the



Window cartons giving product visibility.

sale of all kinds of flour confectionery, cakes, biscuits and other products and to keep them factory fresh until they are purchased and opened for the table.

Considerable advances have been made in recent years in the packaging of biscuits and the search for new materials for packaging continues. Perhaps one may find some of the most outstanding examples of packaging material usage in this field as compared with other sections of the food industry. They have for example, been the pioneers of the usage of heatsealing films, heatfix labels of the delayed action type (these papers are dealt with in Chapter 3) various types of trays, novel boxes with visible windows of film, fancy printed cartons, laminated foils of every kind with their outstanding merits and eye-appealing properties, waxed parchments and allied wrappings, all of which are fully protective and hygienic, gift wrappings of a special nature used to provide a pack with a gift appeal atmosphere ready for presentation for some special occasion, and many other materials which are fancy and decorative, yet fully protective, most of which are surveyed in the appropriate chapter of this book.

The plain carton is fast disappearing in many food packaging operations, either printed cartons or plain cartons with fancy printed or embossed wrappings taking their place. In the case of large packaging operations, special designs, signature papers, gift wrappings, special occasion fancy papers are being increasingly used either as direct wrappings around suitable solid products or as outer wrappings for cartons of the plain variety. Corrugated carton blanks are glued up by automatic methods and some are combined or bonded with latex and produced by hand or machine methods of production. New machinery in this field of packaging has made it possible to produce almost every type of carton blanks, container or tray.

Carry Home Shopping Pack

In this chapter where some current trends are first discussed, some reference should be made to the more recent types of carry home pack, many of which may be used as a display piece and fitted with carrying handle ready to be carried home by the purchaser. For many years, certain continental countries and the U.S.A. have favoured many easy carry away devices by which the public may conveniently handle purchases. Bottled liquids have come in for special attention and display containers holding an average of six units have been one of the more common packs to be seen in the shop window and on the store counter. There is no doubt that the public appreciate such facilities. It is worth noting, however, that the parcel carrier, a device which incorporates a strip of gummed tape with a raffia insertion, used to form a carrying handle when the strip of gummed tape has been stuck down to a kraft wrapped package, has never been really popular in England.

There can be no doubt that the rapid development of the self-service stores and the supermarket have been responsible for the development of many types of carry home packs. Such containers are easily assembled from the flat or collapsed form, filled and quickly handed to the purchaser without the time spent upon packing the goods. In some

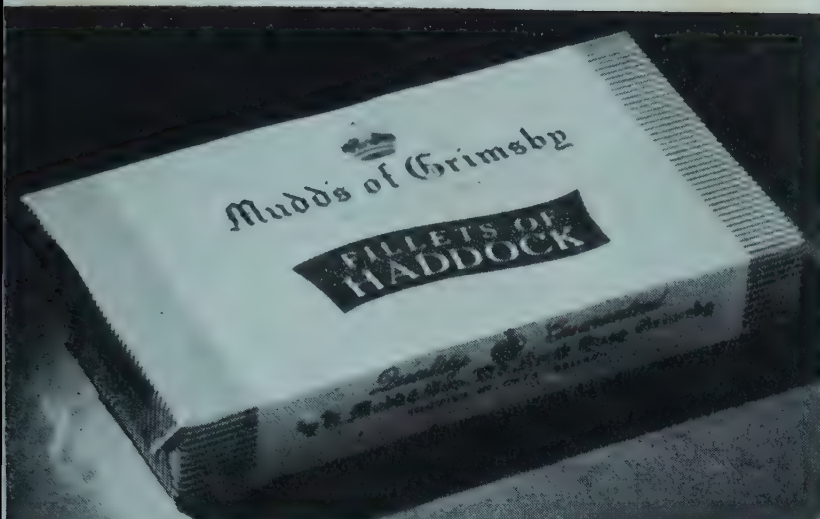
cases, the manufacturer packages a specified number of cans, tins, bottles or jars of one kind or assorted, in a multiple pack, such a pack being used for display and demonstration at the point of sale and a carry away package at the same time.

The former fixed idea among some packagers that the seasons of Christmas and Easter were the only occasions upon which to mark the display piece or packed product by some special or festive type of container, has now largely disappeared. Birthdays, wedding celebrations, Mother's day, the new baby, are some of the additional dates in the calendars, often more important than Christmas, and deserve where appropriate, to be marked with a fancy wrapping or gift box, gaily and suitably printed, that may be ready to address with greetings and handed to a friend or posted as desired. Tie-on tags, gift labels, and wrappings are now available, with place for the appropriate wording, the all-important 'to and from', so that the gift may be immediately mailed with a choice and colourful message in the form of a wrapping. It is merely another case of the greetings telegram as compared with a plain one. Scotland enjoys a considerable trade in clan or tartan wrapped shortbread and allied products. The new special occasion and gift wrappings are really an extension of this rather charming idea.

The carry away pack and the gift pack are likely to develop in appeal and application with the further development of the self-service stores. The necessary machinery is geared up to print and produce all the essential components of the modern multiple pack and its several variations.

Fibreboard Corrugated Packing Cases

In expressing thoughts on current trends in this opening chapter, some reference may be made to the more recent types of tailor-made fibreboard corrugated packing cases, a subject which is fully dealt with in another chapter. In addition to many types of standard packing cases designed with sections to hold firmly in position bottles, cans and like units when packed, fibreboard packing cases may be made to specifications for the purpose of affording additional protection for fragile, delicate and awkward shaped articles. Wads, pads, cushions, protective sections are all part of the modern packing case. Packagers should consult with the fibreboard packing case maker to ensure that the best case for the job is being used. Cases made from fibreboard are now used for liquids, wet and damp products, fruits, vegetables, perishable goods, fragile products, in fact, for every kind of unpackaged and packaged unit sold and put up in various types of containers. Some cases are made and fashioned so that they may be used as a display unit from which items may be taken, demonstrated and sold. All cases are delivered from the supplier flat or collapsed so that they take up very little storage space. They are very quickly assembled for filling. Modern fibreboard cases are waterproof, but they may be made entirely waterproof for export trade if required. Cases may be printed in several colours, thus affording a travelling salesman's advertisement for the goods in transit and on display. The application of foil laminates in conjunction with packing case making as liners is something more recent, while fibreboard



A recent fish pack. Courtesy Transparent Paper Ltd.

cases have been in popular use for some years. Fibreboard cases have now largely replaced other materials formerly used for packing products for despatch.

Frozen Foods

In this field of food packaging considerable advances have been made and this has brought about a need for new forms of labelling and the pricing, branding and coding of foods, with weight, and other details. New types of wrappings, cartons, waxed materials, cans, etc., together with methods of display cabinets have been introduced. More recently, former materials considered essential to this form of packaging foodstuffs, such as filmic liners, filmic outer wrappings and like materials designed to cover printed cartons or to act as linings, have been replaced by gloss waxing processes which render the usual type of materials unnecessary. Containers or cartons are currently made from a heavy substance well-bleached kraft which is pure and free from taste or odour. In view of its rigid character, the material may be fed into carton making machinery producing a first class carton for the purpose. In the case of frozen vegetables, for example, the gloss waxed carton, appropriately designed and printed will be a popular method of this form of packaging in the near future.

In some instances, one has to turn to the continent, Scandinavia and the U.S.A., to see packaging developments in almost every field of usage and application and Danish and Swedish packs in particular have something to show the home packaging specialist. The Findus pack, now a popular feature of the English table, introduces a method of polyethylene coating applied in several forms. Such coatings are now being applied to specialized kraft wrappings and packing cases here at home and there is no doubt that new materials and coatings of a protective barrier type will develop along sound and steady lines for the food packager.

Many continental countries are packaging cold and hot foodstuffs in such a manner so that they may be dispensed from some form of slot machine. The food is packaged on trays in portions ready for eating. The machinery used at all stages of packaging and filling is available in this country and packagers interested in this form of food development

selling may seek information from the appropriate machinery specialist. Filling in such cases is either by hand, semi-automatic methods or fully automatic processes, either of which has some reference to the volume of food packaged.

Aluminium Foil and Laminates

In view of the fact that aluminium foils and their associated laminates may be used for various forms of food packaging as they fulfil the necessary requirements of packaging, they have become more and more popular. Heat-sealing or heatfixing foils, thermoplastic labels and other more recent adjuncts to foil wrapping have come forward, rendering foil wrappings most suitable for fats, lards, butters, margarines, cheeses, biscuits, and similar products which must have a protective barrier to hold desirable moisture in the product and exclude any outside penetration of unwanted moisture. Foils have many qualities and these are fully outlined in the appropriate chapter.

The survey of most of the materials outlined in this chapter takes care of such factors as static electricity, mould forming problems, moisture, damp, fungi, fire, alkali and acid reactions in packaging. Suitable paper, board and container or carton tests may be made under field conditions in order to test for packaging suitability of the material initially selected. Some reference is made here to various ready-to-hand tests which may be applied on the spot to samples chosen. The use and application of electronic devices may be helpful in many packaging operations relative to counting and filling but this book has been designed to deal with materials, machinery and packaging as a combined operation in product presentation, display and selling, taking into account that forms of labelling, pack styling, design, colour and shape are the main essentials to eye appeal and desirable sales expansion.

Food Containers—Cans

Many types of food containers are made of one type of tinfoil or another. For practical purposes, plain or lacquered tinfoil is used and aluminium, the former being popularly used for small sized cans of one fluid ounce to some five gallons in volume while a heavier gauge tin is used for heavier weighted contents of ten or more gallons. Aluminium in various thicknesses or gauges is used for all kinds



Aluminium alloy food cans.



For packing processed Cocktail Nuts in three varieties. The containers are manufactured entirely from aluminium sheet, which is attractively decorated in design and colouring appropriate to the three different kinds of nut being packed.



The C.W.S. printed screw lid tins for chocolate fingers.



Attractively printed 1 lb. capacity dog food cans, 36 are packed in a carton.

of containers and tubes. Both light and heavy weight coatings are applied to tinplate as a protective measure, light weight coatings being used where the probability of corrosion is slight. Heavier weight coatings to tinplate also serve the function of closing up pinholes in the sheet. In addition to lacquering tinplate, modern high speed tin printing machinery based on rotary offset lithographic processes add design and various forms of decoration in order to provide appeal to the finished can. Where a can has been printed or decorated, invariably no other form of labelling is required. Where a lacquered tin has to be labelled, suitable extra tenacious gummed label papers are made to stick to both plain and lacquered tinplate. Such surfaces may also be labelled with heatfix or self-adhesive types of temporary labels, as in the case of price tickets where the label is often removed at the point of sale.

Coatings of varnish are applied to printed tinplate to hold the colour firm and to protect it from scuff or abrasion. Packagers using printed cans of any kind for new products should consult the can maker giving details of the product to be packaged. Where a protective lacquer is necessary, the correct recipe may then be applied to tinplate surface.

Today, the art of tin printing has developed to such an extent that both aluminium and lacquered tinplate may be printed in many colours with choice designs rendering them highly suitable for gifts with an after-use appeal as household containers for other items. Again, the question of tin style, design, printing are matters for the skilled technician as he should be consulted before the final choice is determined. Printing inks used in connection with food can manufacture are made to withstand the effects of processing temperatures and humidity after filling.

At the extreme end of the scale in connection with the production of plain tins are the gift casket containers. Such containers serve the purpose of both a packaging unit plus something with the necessary eye appeal to create a purchase in the form of a gift. Shape and style are often superb,

beers being of a suitable resistant nature. The general considerable latitude being given to the designer. Excessive inner material is often used as protective medium for high class food products. In spite of costs and the necessary purchase tax on some of these items, gift packaging of this kind continues to receive support from the packager of a suitable product. The everyday metal food container is mass produced in two main types, one being known as the 'open top' variety made in standard sizes, the other being the 'general line' type, production being often on a smaller scale. The shape is a familiar one of rounded dimensions, but for some types of food packaging, seamless oval, various flat types and rectangular cans are employed. The mass produced can will always make an appeal to the packager provided it is satisfactory for the purpose as an eye must always be kept on the cost of materials and the special shape, design and style rather tends to add to costs and must be confined to the medium to high class form of product packaging scheme. An example of sizes and capacities is from $2\frac{1}{8}$ in. diameter can up to some 6 in. and the corresponding fluid ounces being $3\frac{1}{2}$ up to 146 in volume, or weight, as the case may be.

After the tinplate has been appropriately treated on the tin printing or lacquering machine or both processes applied as required, the make-up process follows. This consists of various essential operations such as trimming and slitting in order to obtain the basic blanks for bodies, the notching, a process of cutting notches from corners to avoid extra thickness of metal at side seams of the finished can, fluxing, which provides edges for soldering, body forming, whereby the blanks are flexed and formed into the correct shape, the end folded and treated to form side seams for soldering together, flanging, which gives an outward turn to the ends of the open cylinder permitting them to be engaged with and taken up into correspondingly curled flanges on the can ends, and double seaming which is a process of applying one end to the open cylinder in order to seam it in position. Obviously, rigid tests are made in order to ensure that the finished can is perfect in every way and in particular, tests are made in order to ensure that the finished can is proof against leakage, probably the most essential factor to consider in food packaging.

The alternative to the open top can is the general line container and this has been referred to as more specialized on account of the selection of styles and shapes from which the packager may choose. Such styles are not mass produced although the method of production, as far as the main principles are concerned, is much the same. Liquid or other products of a hygroscopic character or susceptible to the effects of moisture are best packaged in cans which must be soldered or compound lined. Dry or inert products are usually packaged in cans with strong seams but without seam treatment. Powdered or granulated products are in the main packaged in cans of round, circular, oval, square or rectangular shapes but some change is made relative to the height. The lid or closure today takes various forms varying from slip-on, screw-on caps, lever lips or the current sprinkler and lip types. There are many types and lid or closure designs should be examined in the light of their

suitability and appeal before the final choice is made. Printed matter, instructions re contents, opening and usage may be suitably designed and printed. All kinds of cushion ring closures are now available and these afford ease of opening yet fully protect can contents and keep them factory fresh, dry and free from odour. Whatever the shaped tin or the form of closure, care should be taken to see that they pack well in the fibreboard or other type of packing case and that they display well and stack flat. 'Rattle' in packing should be avoided.

Some reference may be made here to the more recent types of 'collar can' where both ends are seamed on, one seam being the can manufacturing end and the other the filling seam. Such cans may be opened by a suitable key packaged with the can, the application to a lip at the end of a scored band round the circumference of the body being used to make the opening when the contents are required. In some cases, reclosure after opening is provided by leasing a can end on to a collar. Progress continues in the manufacture of cans and many easy to open and reclose types may be expected in the near future.

Many shaped tins are used for liquids and where the liquid is really fluid, the screw cap type may be best. Whatever types of can are used, the closure must be firm in order to prevent liquid escape. Pourer spouts are now being rapidly developed and many types of screw on tops are fitted with a bottle cap paper to provide a protective barrier for the contents of the can against exposure or crustation. Other types of can may incorporate pilfer-proof devices such as tamper-proof seals and discs so that it is immediately obvious if the contents are tampered with at any stage of storage or display. Liquid contents must be packaged tightly and this may be best carried out with some form of wad such as cork or one of its by-products. Reference has been made to bottle cap papers used in the form of discs in bottle caps and such material is usually resistant to the packaged liquids. The press cap has gained in popularity on account of its ease of closure and opening. Applied finger pressure is all that is necessary to open up the dome-shaped cap which may be replaced as required. Press caps are applied at the packaging bench by hand or a machine which closes a tamper-proof overseal in the same operation as the cap. This is to avoid self-opening at any stage of the packaged product.

Liquid and Beverage Cans

The current tendency to package more and more types of liquids in cans has brought about many useful and attractive styles which keep the contents of the pack factory fresh, provided the packaged cans are stored away and displayed under normal conditions of trading. Beers, mineral waters and other liquids are popular items now packaged this way and the range of liquids continues to grow. Cans today are mostly of the flat topped type, their proportion being somewhat different from the normal can used in packaging solids. These cans are closed by special seamers after filling, a piercing tool being provided for the purpose of opening the can. Such cans are lined with a special lacquer, the one for



Carriers designed for 'cluster' packaging of canned beer, holding 3 x 16 oz. cans. These packs can be supplied with a handle but are quite easy to carry without one. They are manufactured by Hunt Partners Ltd.

clusion reached relative to this and allied forms of packaging is that it is light in bulk, weight and often cost, and the question of returned empties which often vexes the retailer is overcome, and the fact that when glass bottles are returned special cleansing and pasteurizing treatment is often essential.

Some skill has fashioned certain types of cans into novel forms of product containers and others have an after-use appeal. Where the product warrants this special kind of packaging, styling on the lines of a future use for the container is worthy of consideration.

Fundamentally, the packager must regard his package as a safeguard against all forms of deterioration. With certain types of foods, such as canned fruits, peas, etc., chemical reaction with the container in which they are packaged is overcome by the use of cans with an inner coating of lacquer. Tin linings have reached a stage of perfection today, and complaints of this nature are rare.

Kegs and Drums

Kegs and drums are made in many shapes and sizes and have a use and application in the bulk packing of liquids in the food trades. They range in capacity from one to 120 gallons. Current sizes may, however, be classified into a few main headings such as 'Small Drums', 'Light-weight Drums' and 'Heavy Drums.' Small drums usually hold one to 12 gallons. They have fixed or removable head caps to suit the type of product being bulk packed. The facilities for filling and emptying are adequate. Cur-

rent styles are now made with a view to ease of handling by mechanical devices so that they stack flat and evenly. Shapes in some cases are decorative and include kegs, pails, square taper and the Robbican.

The light-weight drum has a capacity of approximately 45 gallons, gauge 16 B.G. and lighter, and have either fixed heads or open end devices. The bodies of most drums are strengthened by rolled corrugations and for large drums, deep rolling hoops are expanded from the main body of the drum.

Heavy drums are constructed to take from five to some 120 gallons. The construction is such that the drum will stand up to considerable handling and rolling and most are returnable against a standard charge. In the main, kegs and drums are made from strip-mill quality mild steel sheet. Tinsplate is also used in suitable gauge, terne or lead coated and zinc treatment. Plastic coated sheet is now in actual production in the manufacture of kegs and drums for various filling purposes. Outside treatment of the current drum container includes painting in colour by suitable paint sprayed or roll coated. Outsides of kegs and drums are destined to become more and more decorative so that printed designs may follow reasonably soon. Where essential, internal linings are included in various types of drums. At the same time, stainless steel and aluminium containers are now being produced and the question of a plastic liner where desirable is also taken into account. This may be in the form of a suitably formed bag of heavy gauge film inserted into the drum which becomes an important part of the packaging operation during the filling process.

For the interest of the packager using or proposing to use kegs and drums, here are the British Standards References:

B.S. 814. Mild steel drums, light duty fixed ends.

B.S. 2003. Mild steel drums, both heavy and light duty, removable heads.

B.S. 1702. Mild steel drums, heavy duty, fixed ends.



Metal drums used for storage of liquids or semi-solids.

Aluminium Containers

The use of aluminium in this country is a relatively recent development but today it has an application in the form of aluminium foil and laminate wrappings, tubes, containers of small items and larger containers for bulk meat and meat product packing. Aluminium is light and very durable and serves many packaging functions which are described in the chapter dealing with wrappings.

Boxes and Cartons

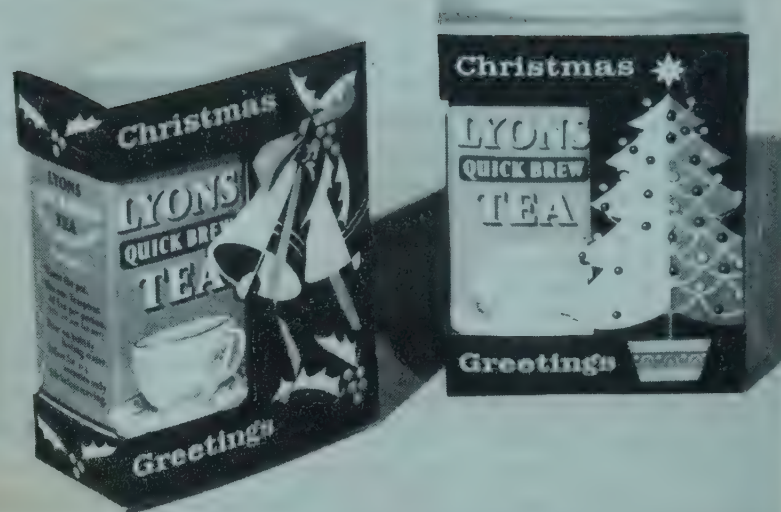
Almost every packaging medium and material, container, carton or box made from paper, a paper laminate, impregnated or coated base material, foil, waxed paper or board, greaseproof wrapping, film or wrapper may be used with every success for some form of food and beverage packaging. It would be difficult to assess what relative volume of food is packaged in glass, paper, board, earthenware, plastic, plain and lacquered tinplate or other material currently used. Suffice to say that the packaging materials offered to the trade are manifold, many are dust- and dirt-proof, thus hygienic, attractive and protective in many ways, each material possessing special qualities with an application to the product packaged. The all-important question of obtaining samples of material, making tests under field conditions and assessing results, must be kept well in mind when a choice of material is being considered.

Under the heading of boxes, containers of all kinds, styles and sizes made from paper, board, metal, waxed board, heavy gauge film and various types of rigid and plastic materials, may be classified.

Dried Food Packaging

Dried food packaging can utilize almost every kind of material which has an application in box or carton manufacture. The popular materials used in this field of food packaging are various types of plain, printed, decorative and filmic bags, cartons of every kind, shape and style made from all kinds of basic material, composite canisters, metal laminates, foils of heavy gauge, metal boxes from the plain printed and labelled types to the exquisite presentation gift casket type of container, waxed board cartons, now so popular for foodstuffs packaged for deep freeze and other protective mediums of food presentation, the simple yet effective medium of packaging in pure vegetable parchment and greaseproof papers, transparent films of every kind, made and branded under various trade names, glass containers in the shape of glass and jars, rigid materials and various types of plastics. There is a wealth of material from which to draw when it comes to the final process of manufacture, that of packaging the product for display, eye appeal and protection.

Paper-based bags, boxes and cartons made from paper and board in various calipers and such materials are used for powdered products such as sugars, flour, tea, cereals, and granulated food products. An interior paper liner or bag within the carton or box is one form of product presentation in the field of powders and granulated materials. The inner liner in such cases has a protective function to perform and such materials as glassine, greaseproof and waxed paper are



Lyons Christmas pack for 2 × ¼ lb. Quick Brew tea packets.

used to keep the product factory fresh and crisp. The field of cereal packaging has been considerably developed in recent years and this form of packaging usually incorporates an inner waxed protective barrier material plus the outer of cardboard, suitably printed and styled to create the necessary eye appeal while the pack is on display in the shop window or on the counter of the store. The composite canister is used for various types of condiments and spices and various types of foodstuffs which are 'prepared' and in such cases an inner liner may or may not be used as price and other considerations dictate.

The moistureproof qualities of foils and metal laminates have an appeal in the packaging of many food products today. In other forms, metal-lined papers, gummed and thermoplastic coated, are used for beverage labels for bottled and canned products and the various materials available in this field are so important to the food and beverage packager that a separate chapter has been devoted to them. Today, metal foils and laminates have many protective qualities from the packaging standpoint which render them ideal protective barriers where moisture from without and the escape of moisture from within are important factors to consider.

Biscuits, cakes, flour confectionery, tea, coffee, cocoa, dried milk foods and allied products are packaged in metal boxes of various kinds. The container is printed with instructions re usage, and in some cases is most attractive, the gift appeal and after-use of the container being taken into account.

Dried food packaging embraces biscuits and allied food products and in this field of packaging, considerable strides have been made in protective wrapping barriers, greaseproof wrappings, heatfix labelling, labels and films with inherent heatsealing qualities, choicely printed labels and seals and other packaging materials, all designed to protect and provide the essential eye appeal so that one brand is chosen as opposed to another. Waxed tissue, papers and boards are used in connection with carton making for biscuits and other dried foodstuffs, but it is interesting to note that similar material is also used for the packaging of viscous and semi-solid items such as ice cream.

Under the title of dried food packaging may be included greaseproof paper and the term greaseproof here includes any paper that is greaseproof such as waxed paper, genuine vegetable parchment, glassine and similar base papers. Such papers are used as inner linings, outer coverings for boxes and cartons for products such as biscuits, cereals, potato crisps and any kind of foodstuffs that must be kept absolutely dry.

Perhaps the most outstanding development of all in the field of dry food packaging has been the development of filmic wrappings. In the chapter devoted to film wrappings, various types of branded films are surveyed and their moistureproof and non-moistureproof qualities are discussed relative to their various merits in the field of packaging and bottle wrapping as required for the particular operation. Films are used for dried food packaging as their special qualities render them suitable for such purposes.

Dried Food Packaging Machinery

Before dealing with a survey of food boxes and cartons in their various forms and applications, some reference may be made here to the high speed machinery which incorporates filling, cut-off devices, heatsealing or heatfixing designed in most cases to harmonize with carton and wrapper producing or forming units. One could cite several examples of the all-in packaging units which provides the manufacturer with the facilities of filling and packaging including sealing and branding the product. Tea is perhaps one of the most outstanding examples of modern progress in packaging machinery development as the product is not touched by hand at any stage of the process until the delivery end of the machine is reached. Here, mechanical handling devices carry away packaged products to the bulk packing stage for final delivery of the product to the distributor or retailer.

Packaging machines will handle wrappings in reel form and where an inner lining is involved, such as tin foil, wrappings are cut to shape and dimension, formed to make up the package ready for the filling operation, the contents of the package being carefully weighed, filled into the formed package, the ends being shaped and folded ready for labelling, sealing or branding in one operation. Packeting is one outstanding example of current progress. In a matter of seconds, paper conversion, packet forming and filling, sealing and branding is carried out and such processes have an application in the field of dry food packaging such as tea and biscuits.

Box Wrappers or Over-wraps

There is a growing tendency to use plain cartons or boxes overwrapped with printed bands, all over printed fancy wrappings, and gift and fancy papers designed for some special occasion. Gift wrappings may be pasted down as liners for boxes, edge gummed or heatseal coated so that they may be applied to the carton by moisture or heat as the case may be. Printed wrappings may be handled in stack form in the flat or they may be used in packaging operations in the continuous reel. It depends upon the volume of foods to be packaged and in some case, the foodstuff involved.

It is usual to fold both the outer wrapper and the inner



A number of composites made by the Metal Box Company's Manchester factory.

liner together where this form of packaging is carried out. The cut wrapper method, however, is employed for many types of powdered and granular materials and in current packaging operations, packets or wrappers are usually formed and filled in a like way. Dried food products packaged into pre-formed boxes, cartons and containers of every type are dealt with in a similar way but in some cases, fillings or contents may be handled by machine or semi-automatic methods. Filling and weighing follows much the same principle, but the process of end packet or carton sealing has some relationship to the product and method of closure, sealing or branding. Chapter 9 deals with methods of end and packet labelling and sealing by various types of adhesive labels and seals.

Dehydrated Food Packaging

The development in this field of packaging has been considerable and further progress can be envisaged. At the present time, dried milk and allied products, eggs, vegetables and soups are among the popular items so packaged. Metal containers are ideal for such purposes and they may be either hermetically sealed by vacuum or gas processes or some form of closure which incorporates a slip or lever lid. Metal-lined foils are used for soups and keep the contents fresh and usable for some considerable time.

The use of suitably waxed cartons is being developed for the purpose of packaging dehydrated foods and this process has long been developed in the U.S.A. and certain continental countries. Such processes can have an application for such vegetables as carrots, cabbage, potatoes and other food

products. There is no end to development in this field of packaging, it is merely a question of time, experimentation and proven results; the necessary material is readily available.

Boxed Products and Their Sales Appeal

Few industries have grown so rapidly as those concerned with the unit and bulk packaging of foods and beverages. Almost anything may be produced by the appropriate specialist provided that he is taken into confidence at the onset of the marketing project. Box and carton construction has now become economically possible particularly where bulk quantities are required. The tailor-made unit for packing and packaging has now become the order of the day, the paper bag and strawboard box have become something in packaging history. Today, with the advent of the self-service store and the supermarket, the buying public recognizes a product by the wrapper, the box, the colour, its shape and style and label. Where established products have built up a prestige value either as a result of a brand label or colour of package, re-styling should be gradual, the new design incorporating some of the valuable good-will established over the years. A new outer wrapper or box should not indicate a new product and it is here that the packaging technician should be taken into the scheme of marketing the product. There is no doubt that the wealth of raw material used for box making has grown in variety, colour, style and quality, and new properties such as strength resistance to wear and tear, barriers for moisture attack have all been formulated by the paper maker and converter for the purpose of better food and beverage packaging. Every type of board coated, laminated impregnated, embossed, grained, tinted, are produced for the purpose of medium to high class box and carton making. Having decided upon the board material for the box, the shape and style is the next important consideration. Most boards will fold, score, bend, wear, print in colour and be capable of wrapping and labelling by any of the established methods and processes of marketing and product appeal.

Box and Carton Varieties or Types

The Materials.—Although the range of board material used for box making is limited, it covers the need of every type of box from inexpensive varieties to the top grade box board used for high grade product presentation. From Dutch and British strawboards to coated folding box boards made in white and a series of tints, there is a board for every kind of box, carton and container. In addition to strawboards used for every day carton packaging purposes, there are white lined varieties of board. Such boards are graded into pure chipboard or grey back, semi and fully bleached types. Today, for special protective purposes, and for ease of product recognition, tinted liners are used if specified in the case of large making orders. Barriers are being used to serve as protective coatings to other types of board. For the high class carton, white and coloured coated (clay) folding box boards are used and these may be obtained in special colours to specification for relatively small quantities. Size 30 in. by

40 in. in calipers from .014 to .022 in white and a limited series of calipers in colours are the usual standard thicknesses. The colours are usually pale tints to permit of good printing results and most grades have good printing, scoring and folding qualities. For special purposes, coated folding box-boards are obtainable in gold and silver coatings. These boards may also be obtained from the mill on reels for large box making operations. The number of boards vary with the caliper and a good example of this is caliper .014 which has approximately 226 boards to the hundred count.

Many grades of white lined folding box boards have great strength and rigidity with excellent printing surfaces and first class folding properties in both directions. Coated folding box boards may be surface varnished, nitrocellulose finished after printing and this is often desirable in medium to high class food packages. Other types of board will not stand such treatment. The bulk is not so high in the case of the white lined grades of folding box board caliper .014 giving approximately 208 boards to the cwt. Board qualities and sizes are given in Chapter 14.

Plain strawboard made boxes may be lined with various kinds of bright, dull and tinted box enamel lining papers, flints and friction glazed papers. Most of these papers will print either by letterpress or lithographic processes of printing. Flints and friction glazed papers will take gold bronzing. Other types of boxes are made from enamel boards, paste and pulp boards, and lined boards among other material.

In planning the initial box template, the skilled box maker, artist or technician will arrange for the utmost material to be used in the board size available. Offcuts often have a further use. This is also the case in bag and envelope making where every consideration is given to the wastage of precious raw material, the utmost being made out of flat size in the make up. The grain direction of the board or paper is always important and in the case of box and carton manufacture, grain should run at right angles to the main crease in order that the ultimate box will be strong, with good creasing at the sides and edges.

Box making is a specialist job and box makers operate in strategic parts of the country where trade groups form in such a way that they are able to deal with the special food producers requirements in style and quality as required. Many medium to large packagers are equipped with a limited box making section and make up their own boxes and cartons on the premises. Hand, semi- and fully automatic methods of box production are employed, corners being wire stitched, corner stayed with stay glued tapes or container tapes, linings and box tops being applied as required. Most boxes are made by female labour and the girls soon become skilled at the special type of boxes on which they work. Where possible, it should be arranged to stock or store boxes and cartons in a flat or collapsed form so that they may be easily formed when required for filling or packaging purposes. Space is often very important in food and beverage plants and packaging materials can take up considerable space.

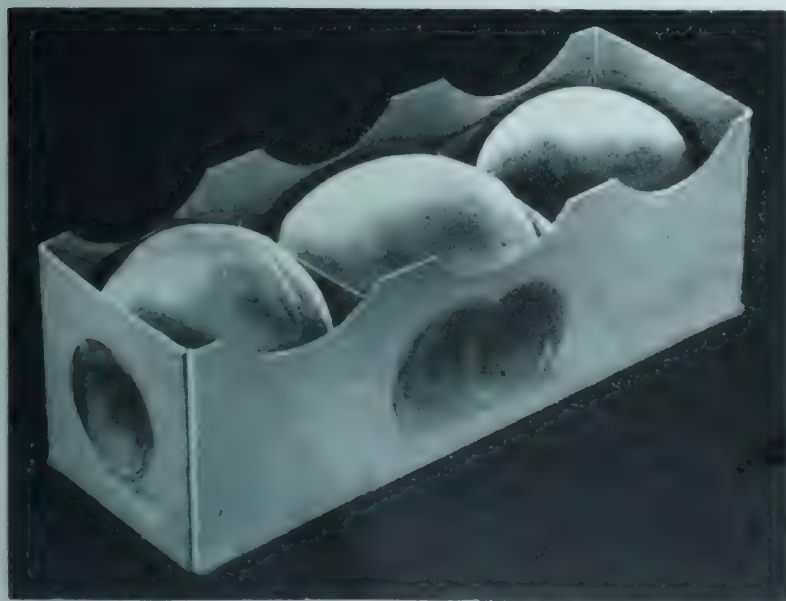
The strength of a box lies in the corners and good quality stay paper should be used of sufficient kraft strength and grip so far as the glue is concerned. Wire stitching should be



New trays for the food and confectionery industry introduced by Cut-Outs (Cartons) Ltd.



A tomato tray made by Reed Cartons Ltd. with special flanges at each end to protect the contents in stacking and to prevent tearing at the edges if a transparent wrapping is used.



Designed for maximum display as well as protection. This peach tray has a quick-lock bottom and does not require gluing or sealing. Reed Cartons Ltd.

well clinched. The best materials are always made to specifications laid down by the appropriate Trade Association, the B.S.I. and other handling and conveying bodies

Methods of Box Manufacture.—Various types of boxes are produced in the flat sheet on the printing press, the printed matter being carried out prior to the process of creasing and cutting. Simple forms of boxes are mass produced in considerable quantities but where involved styles are concerned, the production is often slowed down. Considerable ingenuity has gone into the plant turning out all varieties of boxes and each operation, after the printing process, is a skilled undertaking. Box making machinery has reached a high peak of perfection and there are few rejects today. In order to keep prices down to an economic level, the utmost planning must be carried out in design to avoid material wastage or poorly turned out boxes. Boxes are mainly produced from flat material although large quantities in mass produced processes of manufacture are made from the reel, where the machine invariably consists of a creasing and cutting unit immediately before the actual printing of the material. In the flat, however, the printed sheet is finally passed through the creasing and cutting machine. Printed carton boxes are not, at this stage, completely divorced from the sheet but may be separated from the waste by suitably placed notches when required for make up. The blanks are subsequently stripped from the surrounding waste and then glued or wire stitched. Great speeds are obtainable on modern carton glueing machines which also count the outturn of boxes. Over 60,000 cartons of boxes per hour is a normal day's output on current machinery. Where boxes or display units are made up from more than one piece, wire stitching is normally employed.

A recent carton making machine called the 'Prince' carton gluer, breaks all four creases on the board material used to 180°; it has, indeed, a remarkable capacity, the minimum length of make up being well within its scope, i.e. some 2 in. while the maximum width is 14 in. folded flat. It has a belt speed of 1,200 ft. per minute and also carries overhead glue tanks for double wall cartons. This machine produces some 100,000 cartons per hour and new refinements are being added to this and similar box making machines which help further to increase the output.

Cartons made up in this way consist of display outers and are the popular multiple unit containers which are formed from collapsed display units to house specified quantities of cans, tins, jars, and glass packaged food and beverage products for display and sale. The cartons themselves so packaged are known as 'inners' as opposed to 'outers.'

A popular shape and style for the carton box is rectangular or square and these shapes assist in mass produced methods where price is a consideration. Outers can vary very considerably in style and presentation from the usual three-way band box to some very artistic and choicely printed types. Where medium to high class products are being packaged and presented in a display outer, some consideration may be given to fancy style but cost must be considered where the low to medium grade product is being packaged.

There are many variations of these shapes and new applications of carton boxes are being formulated for the food and drink trades. Tailor-made cartons, boxes, packing cases are now the vogue where fragile, perishable and items with awkward shapes are being packed for store or transit to the retailer. However, fundamentally, there are *four* main shapes around which all other designs revolve and these are the rigid, the skillet, the two-piece slide, and the pull-through.

The skillet is generally considered as the least complicated style of closure having four either rectangular or square cut flaps. These are secured with some kind of adhesive. Upon opening up such cartons, one end of the box has to be released as most types are firmly secured. The tuck-in flap carton has three flaps, the long one being inserted into the body of the carton while the two ends are available for closure after filling. In the case of the skillet, such cases are, in the main, filled by the use of automatic filling machinery, while in the case of the tuck-in flap case, these are filled by hand, no glue being used in the process. The double lock end carton is somewhat similar in style to the skillet end, except that it is tongued and slotted for the purpose of interlocking. This method of closure is firmer than the mere tucking in of the flap and offers more protection to the contents. It is, of course, not a permanent closure of the carton.

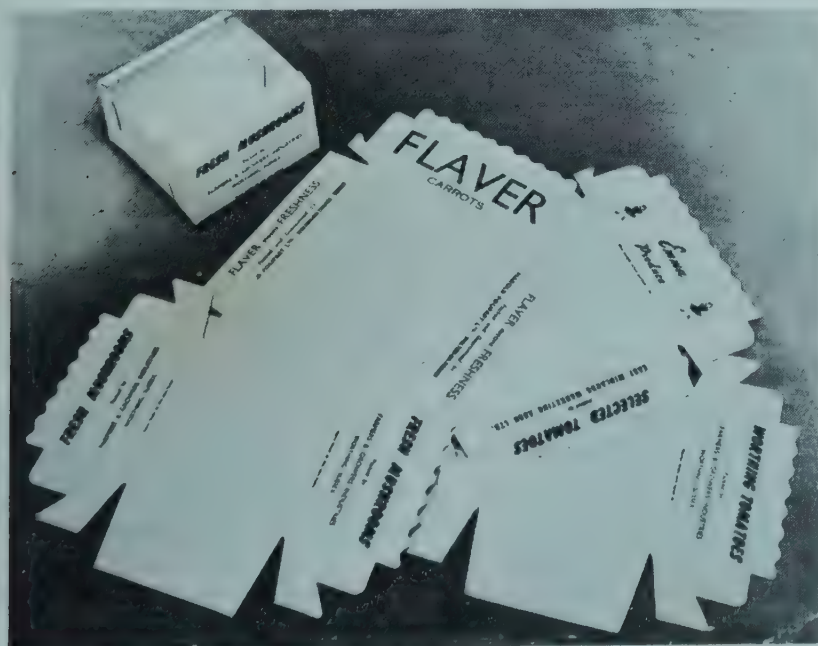
Various styles of flaps may be incorporated into a box if needed, one serving the purpose of the bottom and the other the top closure. There are various kinds of boxes made up from one piece so that they may be fashioned into shape when required. One single piece of board, previously printed, is cut and creased and finished with interlocking flaps. Such boxes are used by the confectionery and pastry trades for the purpose of housing gateaux and cakes. They often incorporate a punched out handle or some fancy printed string for the purpose of carrying away. The uses of such boxes are gradually extending to other trades for many kinds of divers products and articles. They may also be made up from a two-piece construction, the two parts being glued or stitched together. There are many variations of this style of carton carrier, and worthy of note is the bottle display and



This artist/designer is one of many who are always looking for new uses for cartons which will link protection with the demand for surface design and sales appeal.

carrier unit which appears on the market again in the post-war years. Perhaps among the most popular type of carton is that known as the shell and slide carton used for cigarettes, chocolates and other items. These are in two sections, glued, printed with designs in colour on white lined, coated and other types of folding box board.

There are a number of cartons used for confectionery,



Above: A group of well-printed cartons well-labelled, film wrapped food products and (left) easy to assemble autolock trays for mushrooms.



Cartons are used by several prominent wine and spirit houses to enhance sales appeal overseas. Reed Cartons Ltd.

made from white pulp board, waxed material with linings and otherwise. These have block bottoms, and the sides may be glued or wire stitched. There are a few varieties, some with top tuck-in flaps and suitable cords for carrying purposes. Some are collapsible and others are nested together during store.

The full depth lid carton is a type which is formed from two units cut and creased from flat material of various kinds, one section being the full depth lid, the other the tray body. Such boxes are used for hosiery and other allied products. Other types of boxes have transparent windows for the purposes of produce visibility, and these may be of one- or two-piece make up. They are manufactured on similar lines to the carton, cutting rules being employed to obtain the necessary window on the top of the carton. Among other varieties are deep lift-off types, fit out lid types with thumb holes for ease of opening, fancy rigid boxes with flanged edges, drop end boxes, band boxes, boxes with special interior fittings, boxes with hinged lids and many other specialized boxes made for individual trade purposes.

The everyday stock boxes or two-piece cartons, usually made up from strawboard or white lined board, involve merely a sawing, corner cutting and shaping operation, the corners being wire stitched or corner staying with adhesive stay paper. Tight lids to bottoms are essential, and thumb holes assist the retailer who has to constantly open up and close stock boxes of goods for sale.

Composite Containers and Paper Drums

This form of packaging may be briefly described as a container with walls made, in the main, from paper, board or a laminate. Aluminium foil, wax coatings and laminates, greaseproofs and parchments, and bitumen laminates may be used for some individual protective purpose to afford a moisture barrier to the packaged product where required. They are sealed at the ends with metal parts usually made from tinplate. They are used to package many products in the food and allied trades among which are powders, custards, chocolate biscuits, peas, and so forth. Some are made with 'captive slip lid fittings' and other refinements

which again have an application to the product so packaged. Spiral-labelled containers in this field can look most attractive on display, their height adding considerably to the appeal of the pack. There are also special containers used for frozen foods. Metal ends of composite containers may be plain or carry advertising matter with trade mark or decorative design. Aluminium is also used today for end sealing. (There is a further reference in this chapter to the use and application of aluminium in the manufacture of tubes for food packaging).

First class closure of the container is possible in view of the shape and the method of spiral winding of the material used; there are for example no seams, the slip or plug type of lids forming a first class closure to packaged contents. No further application of closure such as tape, adhesive or sealing is required. In design, the technician will always recommend a composite type of container where height and dimension are taken into account. Paper costs less than metal so that height can be an important consideration where costs are involved. Any length from two or three inches up to four or more feet in length may be designed for packaging certain types of products. Decorative labels are usually part of the make up and here printed surfaces may be suitably treated with a lacquer such as varnish, nitro-cellulose and similar treatment which not only enhances the printer's art, but renders the label more durable, dustproof, waterproof and attractive on display. This form of container is best mass-produced and this should be remembered as costs can be high for small runs.

More and more attention is being paid to the after-use appeal and value of the container or carton, and where they are designed with a definite after-use purpose, their continued use after the goods have been used themselves helps to impress the brand or product on the minds of the public. Many kinds of caskets, de luxe boxes and display cartons have a use for many items used daily in the home. There are many other kinds of product containers, and, in recent years, there has been a big development in composite canisters and paper drums suitable for holding powders of all kinds. These are the spirally wound composite containers. Powder containers have the familiar holes punched on the top metal section, while salt containers often incorporate a patent-pourer spout. Other kinds of canisters are fitted with a slip lid or a lever lid of some kind, each manufacturer having a different style. Many composite canisters are made up of two-ply construction; there may be three or more plies in their spirally wound make up, each ply being of a varying paperboard quality. Often the outer ply of the tub is printed in the continuous reel and in this way the process of labelling is unnecessary. Paperboard drums are somewhat similar in all ways but they have paperboard ends and closures as opposed to metal ends.

The straight wound composite canister is, as a rule, lined after forming, being coated with one of the synthetic resins or ordinary paraffin wax, thus forming a protective inner coating for the product or powder. Canisters and paper drums come within the scope of the printer specialist who sets himself out to produce these and similar products for the packaging industry.

Rigid Type Boxes

There are rigid types of folding boxes which are made and supplied collapsible and may be kept in storage prior to filling in a flat state. This assists in the utilization of packing and packaging space where such may be limited. They are quickly assembled for the purpose of filling and their filled appearance is similar to the rigid type of box with its display advantages. Suitable advertising matter may be printed on the surface of the material used in the make-up which is usually some type of light weight boxboard. Cut-out display type of boxes may be designed and made up for the purpose of a counter or shop window unit in the retail store. In this type, the lid carries the printed matter, folding back to reveal packaged contents. The lids are printed both sides so that the design is visible should the box be open or closed. These display boxes are usually well turned out with good, well cut and defined edges and corners.

In the case of the rigid type of box, various kinds of basic material are used in the make up and this will depend upon price considerations and packaged contents of the box. Material varies from strawboards and lined folding box boards, to chipboard and boards with specially finished surfaces, a process undertaken either at the time of board manufacture or by the paper and board converter. The caliper or substance of board used will also depend upon the size and contents of the box. Laminated, impregnated and reinforced board material may also be used where the box is designed to serve as a barrier against moisture, grease, etc., as is the case in some forms of food packaging. Today, both liquids and semi-solids are packaged in paper and board and suitable coatings may be applied to the basic material in order to render it proof against outside penetration as the product demands.

The fancy type of box may be made up from board lined with a printed and embossed lining paper, such as marble, tartan, floral design, special occasion fancy paper or gift lining, signature paper (where the design is composed of the packager's name, trade mark or trading slogan) metal foil or lined papers, plain or embossed, coloured or printed. There are many thousands of designs and patterns now available for box liners, the outside liner usually being of a fancy appealing type while the inner lining, where used, is of some protective type such as may be required to preserve contents or act as a barrier. All of these papers also have applications in bag, wallet and satchel making, so that a whole packaging scheme may be introduced, the chosen pattern being used for all packaging units and containers thus giving related colour and design. Most papers are supplied in flat sheets and on the continuous reel for machine lining and boxmaking purposes.

Rigid boxes are usually either machine or hand made and the method will rely to some extent on the product to be packaged. The main method of manufacture consists of cutting and scoring the material into shaped blanks prior to their formation into the finished box, the work being completed by either wire stitches or glue methods. Stay glued paper or tape is also used for corner staying the box and this makes up first class strong and rigid corners, the most

important part of the box when completed. The strength of a box is said to lie in its corners so that these must be well and strongly finished, with either well clinched stitches, a suitable adhesive or corner stay paper.

Standard Rigid Box Shapes

There are various standard types of rigid boxes and these may be briefly outlined as follows:

A. *Shell and Slide*.—A popular box with tray and slide-on section or over wrapper which is printed with suitable matter. Where small items can be packed flat, such a box is ideal. Used for small ampoules and glass containers, cake decorations, etc.

B. *Flanged Box Type*.—This box may be flanged either at the top or bottom and when decorated and padded lids are incorporated in the make up, they may be used for special occasion and gift packages for medium to high class foods, beverages and other products.

C. *Shouldered Box*.—A suitable shoulder or ridge is fitted inside the box to hold the lid, such boxes being used for a variety of packaging purposes.

D. *Deep, Shallow Lift-off Lid Type*.—This type has a full depth lid with thumb hole opener. The fit-out type is a variation of this style. Strong in usage they are used in many trades where the rigid box has an application. The loose wrapped box is yet another variation in this field. The liner is merely affixed at the edges and does not cover the entire box.

E. *Hinged Lid Box*.—In this type, the lid of the box is attached to the body to form a hinge for the purpose of opening. A cord or ribbon may be attached so that the lid may stand back when opened up for counter display.

F. *The Round Box*.—Fancy foods, preserves, prepared nuts are often packaged in medium to high class round fancy type boxes, often with pleated and padded tops with fine printing and style. Such boxes have a gift appeal. With flanges and piping, shoulders and other refinements, they are used in several trades for eye appealing display. They may be machine or hand made, often to specification.

G. *Drop-fronted Style*.—As the name implies, the front is free from the other sections of the box and may be dropped down for display and demonstration of contents or sale. There are some variations of the drop-fronted style, some made with half drop.

Other designs are developed from these shapes and used in the food trade; the round box, for example, finds a use for cheese, fancy orange and lemon slices, and preserves and in such cases the boxes may be made of white lined board or fancy plywood, many being covered with high class fancy paper and in some cases with cretonne and other materials.

The use of the round box has brought with it a need for band labelling and sealing and this is carried out with colour printed bands, i.e. cheese is a good example of first class printed band work—the band being printed on gummed paper or plain for application with an adhesive. The strength of the material used in box construction has some reference to the goods packaged, the cost of the box and the durability desired. Such fitments as trays, platforms, divisions, segments or wads, pads and cushioning are included as interior fittings for the rigid box so that the contents may be protected, held in position and withdrawn as required on some type of tray or platform. Ease of opening is important.

Boxes may be strengthened by an all over lining of thin kraft, they also gain much from a suitable fancy liner. Where high class fabrics are used in hand made boxes, a really substantial basic box making material is essential. The printed box top plays a leading part in the packaging of many food products and here, the label is well designed and printed in colour in most instances. Some labels are treated, after printing, with a coating of varnish or lacquer further to enhance their eye appeal value as a display piece. There are practically no limits to the style of presentation of gift box make-up and specialists will produce many luxury caskets and other boxes in small or large quantities as required, by hand methods.

Patents are frequently taken out to cover special designs where boxes have been produced to a new specification. Specialized carton and box designing, however, is only practical where high class products are involved in packaging projects which can stand the additional cost involved in design and specialized production. Much may be accomplished with shape and fancy paper linings and with the more recent gift wrappings and lining papers and printing, comparatively plain material can be made to appear very attractive and eye appealing where special food products are being packaged.

Box Liners

Progress takes place from time to time with the formulation of new box liners and impregnates. By the use of the correct liner or board impregnate, frozen or fried foodstuffs may be moisture sealed in their box, the contents being sift proof and completely protected. Such methods of packaging are equally suitable for hygroscopic powders; products may also be packaged in syrup and safely closed before the freezing operation. Self-sealing cartons with suitable linings are now available for special food packaging processes of this kind.

Primary and Secondary Packs

The food packager has a very wide variety of material from which to choose when packaging powders, confections, nuts, dried fruits and similar products. At one time, paper of one type or another was mainly used in the make up of the bag, cone or kite, satchel, wallet, gusseted and bottomed bag, envelope and similar containers, designed to be used by the manufacturer or packager on the one hand and on the other by the retailer dispensing weighed quantities of food products.

Before outlining the various types of bags made for their

many purposes, a review of the materials now available for bag making will no doubt assist the packager in the choice of material. First of all, the term primary bag is used to describe the bag used by the bulk packager, whereas a secondary bag is one used by the retailer as a ready and convenient means of carrying away units or portions of foodstuffs. Food manufacturers and distributors are without doubt among the largest users of bags of every kind, many of which are choicely printed in colour with eye appealing designs incorporating the product name, the packager's or distributor's name and trading slogan and other useful matter relative to recipes, hints re usage or storage of product. In these days of the self-service store and the supermarket, the printed bag plays an important part in packaging and product presentation. Both display and colour assist in creating consumer choice for this or that brand and many products are initially purchased as a result of the first impact made upon the buying public. Printing should be well carried out, the design first class, compatible, of course, with the product, and neatly sealed and presented.

The paper maker and converter are constantly experimenting with new forms of paper, coatings, laminates, impregnates, all of which are being formulated to fill some special protective purpose as a food wrapping with moisture-proof barrier qualities, preserving the product during its shelf life at the same time. The following papers are among the current materials used for bag making, all of these are dealt with in another form in the chapter dealing with wrappings. They all have a special function and application in food packaging and material should be selected as a result of tests or advice from the skilled packaging technician where any doubt may exist. The materials are listed in no special order of merit.

Aluminium Foil Laminates.—This bright, protective and hygienic material is popularly used for packaging fats, butter, cheese, confectionery, chocolate, and has many outstanding qualities, including eye appeal, when made up into bags and satchels, etc. Foils are thin and are best handled when laminated to another basic material such as glassine, tissue, parchment, greaseproof and thin kraft and in this form the material makes up into first class bags of all kinds with strength and fully protective qualities. Foils are lacquered and have good folding qualities for packs. The surface prints well in colour and design.

Glassine and Greaseproofs.—Glassine is transparent and greaseproof may be described as semi-transparent. Both give protection against grease and help to preserve packaged food contents in factory-fresh condition. They are relatively strong although they are transparent, but often not so strong as some types of paper.

Genuine Vegetable Parchment (referred to as G.V.P.).—This is really a high grade, whitish greaseproof with the added advantage of possessing first class wet strength properties. Therefore moist products may be packaged therein, in bags made from this material without rapid deterioration of the paper. Current British parchments have improved white shades and rather more strength than heretofore.

Papers and Krafts.—The term paper covers a multitude of various types of material in thin, medium to heavy weights or substances, in plain, laminated, embossed, fancy printed, designed (with signature of packager or some standard decorative pattern) metal lined papers, cheap wrappings such as are used by the butchers for meat wrappings, inexpensive manilla papers some of which have extra strength over ordinary white grades and others which are almost untearable. Sulphite papers (the type of paper used for retail bag make-up) is available unbleached and semi-bleached. Kraft wrappings are also used for bag making and these papers are recognized for their brown colour and are made in many weights or substances. Kraft, the word meaning strength, is made in many qualities and such papers are tested for breaking and bursting strength, very important factors in the make up of some kinds of paper bags and carriers. Where strength is required, medium to high grade qualities of kraft should be specified.

Cellulose, Filmic or Viscose Wrappings.—Made under various trade names in colourless or white and some half a dozen colours, these papers are surveyed in Chapter 4 in view of their importance to the food and beverage packager. They are fully transparent and make first class visible packaging possible so that the contents may be seen while the goods are displayed. At the same time, they are fully protected from dust, and if the correct material is used in packaging, from moisture and other undesirable factors. The important matter is to know the film and its qualities, limitations and special application to the packaging of a specific group of foodstuffs. Many viscose wrappings are made with inherent heatsealing or fixing qualities so that packages, bags and envelopes may be heat sealed at the seams, mouth or openings of bags. Bags, sleeves, wallets and direct wrapping foodstuffs and bottled products are all within the scope of filmic wrapping and packaging. No detailed account will be given at this juncture on special branded films but some reference to Polythene may be useful. Polythene is a synthetic plastic filmic material with many outstanding qualities. It affords barrier resistance to the passage of moisture and moisture-vapour and may be used for low temperature packaging projects. It does not become brittle and will not crack. The importance in food packaging of such films as Pliofilm with its inherent heatsealing qualities as a result of its rubber based content, and its great resistance to moisture, moisture-vapour and odours cannot be too strongly emphasized.

Waxed Tissue and Parchment.—Considerable quantities of waxed papers are used in packaging and bag making on account of their special waterproof and moisture resisting qualities. Such paper is hygienic and has special qualities where food packs are concerned. Waxed papers are dealt with in Chapter 5. Waxed papers are made from strong basic material which is printed prior to the waxing process. Another material used for packaging and bag making where a barrier is desired is the lamination of two moistureproof filmic wrappings using wax as a laminant. By a special process, the film may be printed thus forming a very

attractive packaging medium when made up into bags. Many new developments may be expected in filmic wrappings and their conversion into bags and wallets.

Other materials used include fabrics and linen although these, formerly popular for packaging powders, have been replaced by new material. Visibility of packaged product contents will always make a strong appeal to the packager who knows that his product is seen and yet protected from the elements.

In every trade, special wrappings are used for direct wrapping of products and for bag making. Sugar papers, fruit wrappings, grocery papers, biscuit wrappings, bottle wrappings, krafts, rockets, roll holder papers, sulphites, and tea cartridges are some of the special bag papers made for the food and beverage trades and have an application and usage in their own special field of food product presentation. All of these papers may be used for bags and for wrappings and are obtainable in sheets, reels and rolls as required.

Bags and Wallet Styles

Illustrated are some printed pockets, envelopes, bags and satchels used for packaging various food and allied products. They are most attractive when printed with a good design and in colour. They are a convenient and relatively inexpensive form of packaging.

Bags with Serrated Tops.—This type of bag is obtainable flat or made up in the satchel style when they usually have expanding sides or gussets. They are popularly used for potato crisps, retail food of many kinds, loose items and liners for tin boxes and carton inner linings. The make up of this type of bag includes printed matter, the bags being made from various kinds of basic paper such as kraft, transparents, parchments, sulphites, laminates and waxed papers.

Bags are mass produced on modern high speed bag making machinery, the paper being fed through the machine from the reel. Some are made from the flat or more correctly from punched out blanks or shapes. The important consideration from the standpoint of the retailer is that secondary bags and carriers used for purchases should be sufficiently strong to enable the goods to be carried home safely. Some do break open at the vulnerable points, resulting in damage to contents or complete loss and a possible loss of goodwill on the part of the customer.

Block-bottom Types.—The Rose type of bottomed bag is somewhat similar to the flat type of bag except that the Rose or block bottom enables the bag to stand upright for the purpose of filling. It has a special application in the packaging of sugar, dried fruits, cereals and similar food products. There is also the Box type and self-opening satchel and in this case the bottom is always flat and rigid. Better class material and strong types of paper such as krafts are used in the make up. Such bags often incorporate a sealing flap and any of these facilities may be obtained by specification at the time of ordering. They are easy to fill and enclose and may be sealed at the mouth by self-adhesive tape, gummed tape, adhesives, wire stitches, metal fastener of some kind, cords or ribbons, or if the material used for the bag has



Illustrated are examples of cellulose film printed packs and bags.

heatsealing properties, they may be heatfixed. Thermo-plastic heatfix labels are used in the process of sealing some types of bag packaged products. Methods of container closure and sealing are fully dealt with in Chapters 9 and 10.

The Cone or Kite Bag.—This is an established form of bag associated with the confectionery trades. It has a use in the food trades for the packaging of powdered products, sugars, etc., in weighed quantities. In construction, it is very simple, merely consisting of a single sheet of paper, folded and secured one edge by adhesive. The retailer often 'twists' his own cones or kites. In the high class trade, metal lined papers and fancy types of decorative wrappings are used for such bags.

Bags made from Filmic or Cellulose Material.—It would be difficult to state, without research into usage, which is now the most popular type of bag used from the standpoint of material. However, film in all its branded grades is being increasingly used for visible packaging of all kinds of products, not the least foods and glass packaged beverages. There are many types of bag made from film mostly with straight cut edges and these are used for hygienic and protective packaging. They are also made with the fold-over lip or some kind of flap for the purpose of sealing. Printing is usually carried out in the case of food packaging bags on the outside of the film. Printing effects may be obtained in the case of high class food packaging by using two films and printing upon an inner surface, thus making a double walled bag. Where necessary, transparent adhesives are used in bag make up so that seams are not visible. As already mentioned, heatsealing films present no closure or seam sealing problem as they are sealed by pressure and heat from a hot iron, hot plate or by means of a heatsealing unit incorporated into a packaging or filling machine. Aperture or window bags or those with transparent faces are now extensively used for dried fruits and other forms of food packaging. Some kind of film, glassine or greaseproof is used for the window or

face, this being combined with a more rigid type of material such as card, folding box board, or white line strawboard. Combination of material in this form of bag making is flat, the block bottom or satchel type of bag being some of the varieties. The transparent window satchel bag is becoming increasingly popular for food packaging, protection and visibility of packaged contents counting for so much in presentation and display. There are many variations of the combined film bag and packagers with a new product to pack may, with advantage, consult the bagmaking specialist for advice on the best type to use.

Double Turn-up Bottom Bags.—This bag is produced by twice turning up the bottom of the bag where film is used in the construction. Film and paper or card may be combined in many ways to give strength and visibility to the contents of a pack. Such types of bottomed bags are used for cereal packaging and for similar small contents or for foodstuffs.

Open-end Bags.—Another term for the open-end bag is 'tube' and they are used for confections and stick items such as barley sugar. Waxed paper, film and greaseproofs are used for such types of open-end bags. When made from heatsealing films, the ends are merely heatsealed.

Pockets and Envelopes.—Various types of pockets and envelopes may be used for packaging fine food products in powder and similar granulated form. These may be either primary or secondary packaging mediums, depending upon the product and the bulk to be handled. Both shapes are made from pre-punched out blanks and illustrations are shown of shapes. Packagers and manufacturers may also use certain types in this range for direct mailing and for sampling purposes and for this reason the shapes in plain form are shown for general interest. The packagers should specify whether the seam should fall in the centre or side of the wallet, envelope or pocket as this may have some influence upon printed design and product presentation. The

make up includes gum sealing flaps and more recently self-adhesive flap sealing for closure. In view of the considerable precision present in the manufacture of the envelope, pocket and wallet, such packaging mediums are ideally suited to automatic processes of packaging, filling and printing. Here again, any kind of material may be used for any of these types of envelopes or wallets.

The Duplex Bag.—In the packaging of certain types of foodstuffs such as coffee, sugar, dried fruits, duplex bags, i.e. those made with a suitable liner, are generally used. Thus the liners may be, *inter alia*, of greaseproof, parchment or glassine. In this case, an outer paper of some strength is used and this may be duplex in variety or varied. Strong bottoms and often handles are incorporated into such types of duplex bags. Bags are also made from laminates of polythene and viscose film, the latter being the outside material. Such combinations are used for cheese and bacon packaging. In the process of packaging, the bags are filled and the air is withdrawn, the packaged contents being heatsealed or secured as the case may be.

Carrier Bags.—Where the consumer may be encouraged to carry away purchased products in kraft carrier bags, the retailer must realize that delivery time and costs are being saved. More and more consumers are carrying away purchases, and it is therefore important to see that the carriers used are of the best material possible and do not 'let down' the purchaser. Kraft and wrappings from which carriers are made conform to some standard of breaking and bursting strength and this should be specified in carrier make-up if customer satisfaction is to be achieved. The consumer is willing to pay a nominal charge for a carrier but it should be first class in strength. It should be remembered that the carrier can carry printed messages, trader's name and slogans and this is seen wherever it goes. It also reminds the purchaser of the source of supply or purchase. Much more could be done in securing a stronger and better carrier bag in which to house retail purchases. Carriers may be obtained with gussets, strong carrying handles, cord for closing and other refinements. Food retailers should therefore use the best carrier with strengthened bottoms, good carrying handles and with well printed designs. This should pay dividends in the process of time and trade development. Carrier bags can be made with linings of greaseproof and similar material; some are wet strengthened and

may be used for wet fish, frozen foods, cooked chicken, continental foodstuffs, and top grade fruits. The container in such cases should be compatible with the product.

Bag, Wallet, Envelope and Satchel Printing.—Whether the bag or envelope be made from flat blanks or produced from the continuous reel, first class printing in the form of letterpress or design may be obtained. All processes of printing may be brought into the scheme be it letterpress, aniline, photogravure, offset litho, flexographic or even silk screen printing for the initial small job in many colours. Packagers with a new product to package should consult the specialist when first class designs in one, two, three or more colours may be submitted for approval. Whether the run be short, medium or large, some form of printing may be devised to suit every need and purpose. The larger project will be mass produced and this often involves photogravure where plates may be required, but this initial cost becomes lost in the spread over of long and continuous repeat runs. The specialist may often recommend the combination of two types of printing thus producing the finished bag at a reasonable cost. Wherever the silk screen process of printing can be used, it is worth bearing in mind that small runs in many colours may be carried out not only on paper based materials but also on glass, plastics, boards, woods, tinfoil and other materials. A general survey of all printing methods as applied to tinfoil and paper based material is given at the end of this chapter.

Glass Bottle, Jar and Container Packaging

Glass is an important factor in the presentation of food and beverages and considerable quantities of bottles, jars,



Examples of printed seasonal patterns for filmic bags with (on the left) plain window for product visibility



Fancy glass containers for pastes, powders and granulated food products.

vessels, containers of every kind are used in these industries out of the gross volume of 4,500 million containers produced annually in this country.

While being fully transparent, glass containers are made in colour, either translucent or opaque, patterned or plain. Glass is hygienic being inert to mould growths. It may be filled with hot or cold products and when empty, may be cleaned or washed and sterilized. It is not affected by moisture penetration, odour or gases and for mass produced forms of bottling and packaging, the glass container can cost relatively little as compared with other materials. The fact that bottled containers reveal the contents to full view, adds much to sales appeal and product examination of contents at the point of sale. While standard types are readily available and costs are low as a result of mass production methods, individual designs and fancy shapes may be obtained by arrangement. The wide variety of liquids, semi-liquids, granulated items, powders, tablets and other items which may be packaged in glass, renders them an important consideration in packaging programmes for food products. It goes without saying that for beverages and drinks the

glass container is a 'must' in most instances. Cans are a relatively new departure. Seals, caps and closures for sealing have also reached a high peak of perfection and many types of decorative closures exist which are air-tight and fully efficient in every way. Printing assists in branding the product and colour puts the finishing touches to the glass packaged food or beverage. Much more could be done with glass by the packager and some consideration of more decorative shapes in glass and its applications could well repay many food packagers.

In addition to the very wide range of liquid adhesives available for bottle labelling and branding purposes by all processes, heatfix thermoplastic labelling, dextrine and pure gum arabic labels are now available for sticking to all types of glass containers, thus completing the presentation of the product in glass.

Glass Testing

During the course of container production, tests are carried out in order to control quality, weight, size, shape, contents, dimensions, state of annealing and the general resistance of glass to physical and chemical considerations. While colourless glass is predominantly used in packaging foods and beverages, several colours are now available including blue, amber and green shades. Some shapes of glass containers are illustrated from which it will be seen that many standard sizes and styles are readily available to the packager. Spherical shaped glass containers prove to be stronger than those of a fancy shape or square style. All kinds of pattern embossed and recessed lettering may be included in the special making, but only one colour may be made at one time in one making. Jars with wide necks are obviously best for jellies and semi-solids and beverages may be packaged in narrow necked containers or bottles.

Some small reference has already been made to caps, seals and forms of closure and here considerable improvements have taken place in shape, colour, style and function. The introduction of bottle cap papers and discs which are inserted inside crown tops or corks has done much to preserve bottled contents. Both friction and vacuum types of bottle



Standard sizes and shapes for packaging pastes, sauces, pickles, jams and other liquids.



Screw cap types of glass containers for liquid and semi-solid foods.

closure are used and such closures as cover corks, bungs, press-on or snap-on caps, glass stoppers, rubber and metal vacuum sealing and closures are part of the current method of bottle sealing. Among other types of closure are screw or plug types made in metal or plastic, pre-formed closures, crown corks, self forming closures of various kinds, the roll-on or pilferproof types being examples. Aluminium caps, laminated paper and impregnated papers, used as inner closure caps, all assist in the maintenance of quality and sterility. The bottle and closure must have some relationship to type and food or beverage packaged and here advice may usefully be sought at the onset of a project.

Glass containers may be designed as a means of quick and easy recognition of a brand or product. Shape, colour, style and general presentation may be styled so that a name is easily identified where goods are on display. Shape may also facilitate handling and the method of filling and packing in the ultimate corrugated packing case. These are considerations which may count for much in the styling of a

glass container. Where liquid products are poured or used in small quantities from time to time by the consumer, a tapered necked bottle may have an advantage. Where sterilization is concerned, a wider necked bottle may be important. While certain shapes for products such as jams, pickles, milk, beer, beverages, sauces have long been accepted in the trade both from the standpoint of container manufacture and user convenience, some regard can be paid to individual requirements although this can add to the cost of production. British Standard Specifications have been established for some industries relative to shape and form of bottle closure and here again, some advice may be sought with advantage.

Wood, fibreboard corrugated packing cases have been designed to pack specified quantities of glass containers and the manufacturers of such cases will give advice concerning the best style of case to be employed for despatch, storage and return of empties where this applies.



Some decorative beverage bottles.

Glass Container Filling

The type of filling, i.e. free-flowing, viscous or liquid, must be considered both as to the kind of glass container used and the machine used for filling. The wide-mouth container obviously lends itself to more rapid filling but some tolerance must be allowed where neck, height and bottle capacity are considerations. Fitted caps must also be taken into account and the permanent label, such as may be provided by the label, the cellulose slide-off transfer or coloured vitreous enamel style label must be considered where returned empties need washing. Labels must not hinder washing up processes by clogging washing machines. Glass is strong in all dimensions and if ordinary precautions are taken little or no breakage should result from even careless handling.

Sectional corrugated or fibreboard packing cases are best for packing glass containers and each bottle should be packed as a separate unit. Even when dropped or carelessly handled, well packed glass containers do not break. Bottles have to withstand internal as well as external pressure and everything should be done in the final operation of unit packing to ensure a good fit into the packing case. The storage of bottled beverages and other liquids should be under the best possible conditions as the open air can bring about an all-round deterioration. Some form of pallet for ground storage is good and overhead coverage is often important to prevent rain from causing damage to bottles, jars and their labels.

In processes of bottle filling, allowance must be made for space between the top surface of liquid contents and the form of closure. Where bottled products are exported, allowance must also be made for possible liquid expansion. Special closure corks may be fitted to allow for internal pressures of this kind. Bottle cap papers can serve an important function in bottling certain types of liquids which have to be opened from time to time and the lid replaced, and it cannot be stressed too strongly that advice should always be taken from the glass and closure specialists.

Packing materials must be tested for requirements other than strength. Wrappings may be required that are either acid or alkaline free and fibreboard packing cases which allow the product to 'breathe' may be required in some processes of product packaging and packing. All these special papers and materials are readily available and the more recent packing case made from corrugated fibreboard material, complete with carrying handles and perforated holes, can serve many important functions in packing products. Waterproof materials may often be required and these too are readily available to the packager and the packer of every kind of product.

It is not within the province of this book to deal with the bottling, canning and filling of beverages such as beers, soft drinks, milk and other liquids; the author's object is to discuss and describe all current methods of food and beverage packaging and packing as related to materials, i.e. paper, board, glass, tinfoil, plastic, polythene, film, foils, laminates and impregnates. Much the same types of materials are used both in food and beverage packaging. Knowledgeable awareness of all materials now available is of paramount

importance both from the standpoint of their qualities and applications.

The advantages of the glass container are many: they are clean and they are also strong, and often strength can be combined with beauty. Anything from very small phials to 10 gallon carboys with shape to meet the contents with wide or narrow necks which facilitate emptying or the filling process are possible. Glass too is a barrier to disease and contamination and glass may be kept clean and sterilized. In conclusion, glass is perhaps the oldest of the packaging materials used. Two thousand years ago the Romans entrusted their most valuable perfumes and medicines to the safe keeping of glass bottles. In Britain today, container manufacturers constantly strive to improve the general appearance, appeal and usefulness of every glass bottle and jar made. There is perhaps no window display quite so attractive and appealing as one set out smartly with glass packaged jams, foods, jellies, liquids and beverages, all in various sizes, shapes and colours with their eye appealing colourful labels, with tops and caps of colour which harmonize with the general colour scheme.

Waxed Cartons and Cups

Wax has often been described as a versatile material, its outstanding water resistance and moistureproof properties in the process of wrapping and packaging processes being merely one of its many applications. Wax too is used in processes of both paper and board making and in the paper coating and converting industries in the case of materials and containers used for food and beverage packaging. It assists in the preservation of many kinds of foodstuffs, and it is also used in poultry plucking. Chickens are coated with wax and then scraped down when the feathers readily come away with the wax. Finally, the birds prepared for the market are packaged in cartons lined with waxed paper! Petroleum waxes are manufactured at oil refineries where the basic waxy material is distilled from crude oils rich in waxes. It is also obtained in the course of lubricating oil manufacture. The final waxes are then produced either by 'sweating' or by the use of solvents.

Current packaging demands for waxed materials are great indeed and some 70 per cent of the petroleum wax for the home market in the U.S.A., is used to produce moisture-proof waxed papers or cartons of some type.

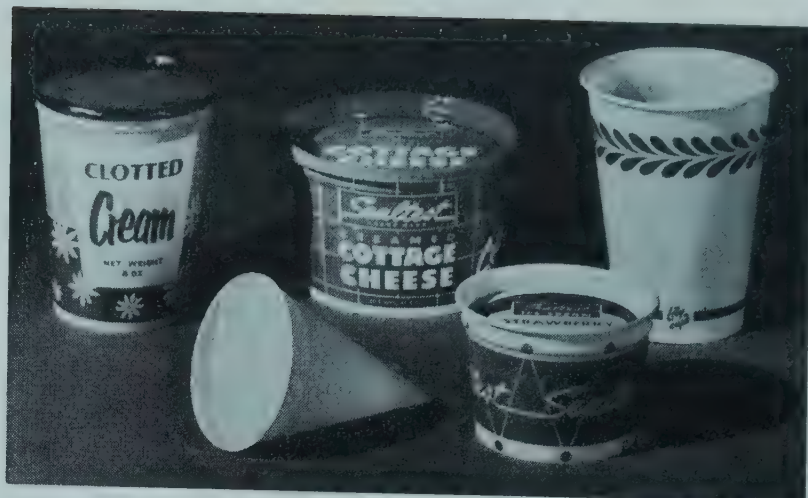
Making Waxed Paper and Board

In the process of waxing base material, the paper or board passes through a bath of molten wax on the continuous reel and thence over a system of rollers which removes excessive coating of the material. Coating spread, temperature of wax and pressures will vary relative to the ultimate requirements of the finished waxed paper. Obviously, where printing is required, this must take place before the actual waxing process as wax will resist printing ink and moisture in general. If the base paper is to be coated on one side only, it passes over a tension roller and then in between two squeeze rollers. One of these is heated and revolves partially immersed in the bath of molten wax. From then on, the paper travels to the finishing rollers, which may be steam

Some Waxed Cartons and Cups



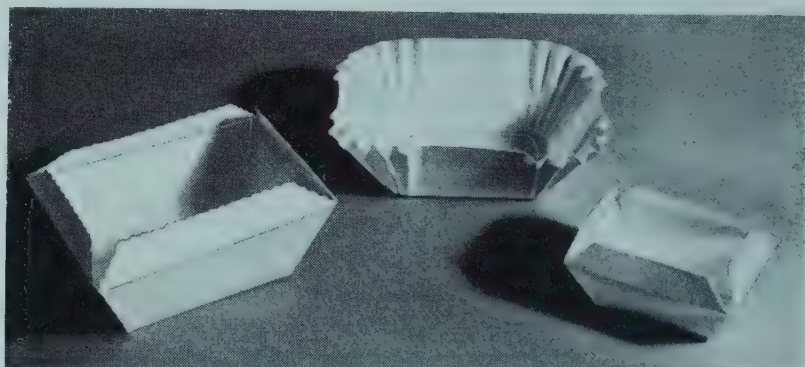
Above are shown some examples of Lily containers printed to customer's requirements and (below) ten 8 oz. containers with overall lids printed with the Lily leaf motif.



An 8 oz. cup with foil closure, a 3 1/4 oz. cone cup, an 8 oz. container with reseal closure, a 3 1/2 oz. squat ice cream cup and a cold drink cup.



Above: Two 8 oz. lidded Lily cups and two 7 oz. Lily cups and (below) moulded waxed trays suitable for cut-off portions of poultry.



Mansell Hunt Catty & Co., Ltd.

heated or chilled and this will depend upon the process in use. When only a little wax is wanted on the paper's surface the rollers are heated. This has the effect of driving the wax into the base paper thus becoming impregnated. The product is termed 'dry waxed' paper. In the 'wet waxing' process the paper is completely immersed in a bath of molten wax. From then on, the paper travels to the finishing rollers, which may be steam heated or chilled and this will depend upon the process in use. When only a little wax is wanted on the paper's surface the rollers are heated. This has the effect of driving the wax into the base paper thus becoming impregnated. The product is termed 'dry waxed' paper. In the 'wet waxing' process the paper is completely immersed in a bath of molten wax after which it passes through a bath of refrigerated water where it is shock chilled a process which produces the final high finish and gloss which gives 'tone' to the wrapped carton or box.

Waxed cups are used for both hot and cold drinks, for plates and picnic purposes, packaging foodstuffs, ice creams and dairy produce, and other outdoor items. In the food industry, waxed carton containers and cups are used for butter, margarine, cooking fats, lards, preserved fruits, frozen foods, fish and pastes, jams, honey, marmalade, icing and special sugars.

In the field of soft drinks and brewing, such beverages as minerals, squashes and beer are now packaged in waxed containers among other materials.

Many different types of disposable paper cups are now being made in the almost fully automatic British plant of an overseas company. They can deal with products ranging from ice cream and cottage cheese to beverages as hot as 180°F. The automatic vending machine is designed to work in conjunction with the waxed cup.

Tasteless and odourless waxed cartons are used for many

food products for everyday sale in the grocer's store. Fruits, peel, nuts and many fatty products are now packaged in choicely printed containers free from the danger of stain or fat penetration to outer package surface, the pack remaining factory fresh. Waxed cups and containers certainly make prepackaging simple and in many cases, eliminate weighing, labelling, marking and heatsealing operations for closure. They withstand the extreme rigours of refrigeration and frequent handling by the buying public when sold under conditions of self-service.

Rounded shapes give the impression of the bigger container and help fruit packaging by conforming to the contour of most types of fruits. Their wide mouths permit of easy filling; they nest while in store prior to filling and save space in this way. Cups used for beverages have many advantages in that they are leak proof, light, and ready to drink from. Most types are coated to withstand the acids of fruit juices thus preventing liquid penetration into paper or board. Some cups are coated so that the natural characteristics of beer are retained keeping a 'head' longer than glass. Sizes in most cases are wide and cover almost every liquid and solid packaging need. Soft drink cups are made from 4 oz. up to 12 oz. in size, while beer cups are made from 7 oz. to 12 oz.

In practice, cylindrical and tall rectangular cartons are waxed after forming while shallow box-shaped cartons are treated in the flat sheet. Preformed cartons treated by the coating process are initially dipped into the bath of wax and cooled off slowly. Some waxed cartons are coated by spraying but the fundamental need is a good all over coating of wax with a high gloss finish.

Many waxed cartons and containers are made plain and others are of a decorative or fancy nature. Some are made under branded names but other well-known types are those used by the housewife for jellies and trifles, and those used in the delicatessen shop for food portions.

Mono Containers.—These cartons and containers are used in the dairy trade for cream and in the ice cream industry. The food trade uses them for peel, glazed cherries, almonds, chocolate and other spreads, potted shrimps and fish products of other kinds. They are well known by their conical shape and are made from pure sulphite paper or board. They are of three-piece construction, i.e. the body, the closure and the end. In the process of manufacture, the bottom is locked into the end firmly and after filling, lid closure is made. The use of circular disc lids produces an easy opening device and there is also a screw type cap which engages with a screw thread rolled on the body part during the manufacture. There is also a foil lid type and this is sealed to the container by special tools.

Rectangular Waxed Cartons.—Made under various trade names, these cartons are produced in much the same way as ordinary types. The material is printed, then cut and creased for folding and side seamed. Both sides of the carton are creased above the shoulder as this assists closure and

this may be carried out by heatsealing and pressure among other methods such as metal or plastic spring clips. With some variation, such cartons are used for packaging fats, frozen foods, milk products, the method of closure being suitable to the product packaged. Waxed impregnated moistureproof containers are made under trade names in assorted styles to suit various prepackaging operations. Most afford the best possible barrier against moisture penetration and assist in the retention of flavour and desirable moisture present in the packaged product. The temperature of the product is maintained for relatively long periods so that the shelf life of such packaged foodstuffs is good. Both fresh and frozen foodstuffs may be so packaged and cartons of the high gloss waxed coated type are used for ice cream which is consumed very rapidly. A new type of spill-proof carton, made and branded as 'Hermetet' is complete with lining material to suit special products, the carton being heatsealed after filling. Full protection is afforded to the product.

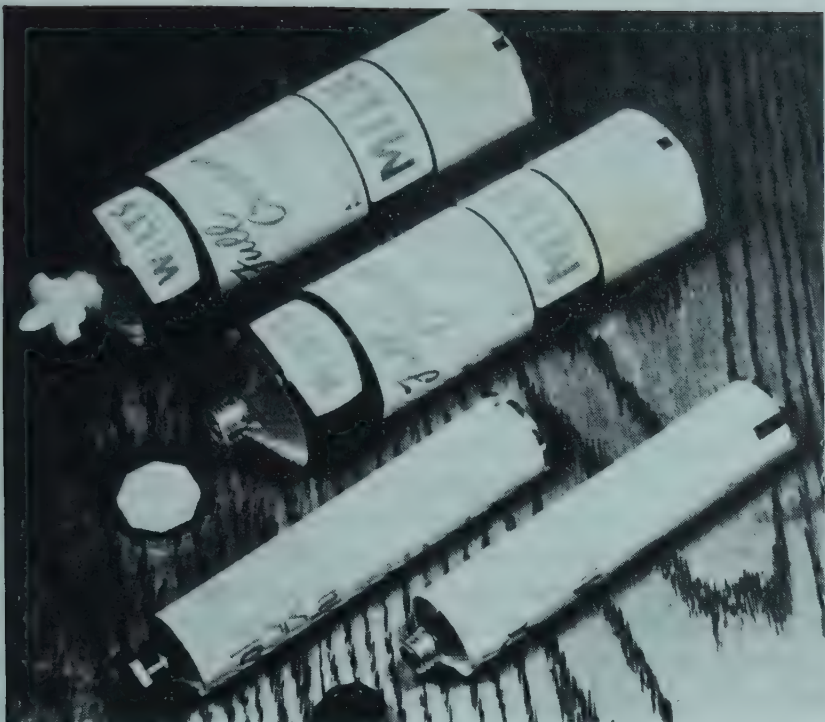
Waxed based material will not replace tinfoil, glass, plastics, wood and other packaging material, but its application is wide and the bounds of usage will be extended in the near future for many kinds of food and beverage products.

Collapsible Metal Tube Packaging

Although food in tubes is a fairly recent development in England, numerous types of food products have been packaged and sold in this form on the continent for some years. Preparations such as mustard, tomato purée, cheese spread, sweetened condensed milk, mayonnaise, anchovy paste, and chestnut purée are some types of foodstuffs now packaged in this convenient form. They have a special appeal to the buying public for outdoor picnics, and sell well in the self-service store. Many of these packs are of continental origin. Advice is freely given on the suitability of tubes for any type of food product and the Collapsible Tube Manufacturers' Association plays a special part in this service.

In the first place, the tube is very handy in that it is an applicator as well as a pack. The packaged contents are readily extruded, when and where they are required, no spoon or other implement being needed. Tubes with a special shaped orifice, such as may be used for cake icing, mayonnaise, and anchovy paste, allow the spread to be applied in the form of some decorative pattern, thus ribbon garnish to cakes, salads, canapés is possible. Once the cap is replaced after a quantity has been extruded, the tube is airtight. There is no danger of food contamination or drying out. Tubes are therefore, hygienic and strong in addition to being very light in weight. The freedom from breakage is important where food is carried in a portable form for outdoor usage.

Freight charges may be saved as packaged tubes are light in weight. The cost of tubes also includes cap, label and liner. The sales advantage outweighs many other packaging considerations. The smooth glossy enamelled surface of a metal collapsible tube can be printed in any design and in several colours in line or half tone process. The attractive



Examples of aluminium tube packaging.

plastic cap, the shining silvery shoulder and the decorative printed work all combine to make the collapsible tube stand out well on display and is at the same time, an acceptable container for use in the home, the hotel or on the picnic. Tubes are used for products which dry out easily as it has been found that there is little or no waste when these containers are used. In Switzerland, for example, 95 per cent of prepared mustard is sold in tubes. Other products sold and used only occasionally and in small quantities, also prove suitable for this form of packaging. Welsh rarebit mixtures, spices, ketchups and other flavourings, and vitamin additives provide further examples of products which may be economically packaged in tubes.

Tube Make Up

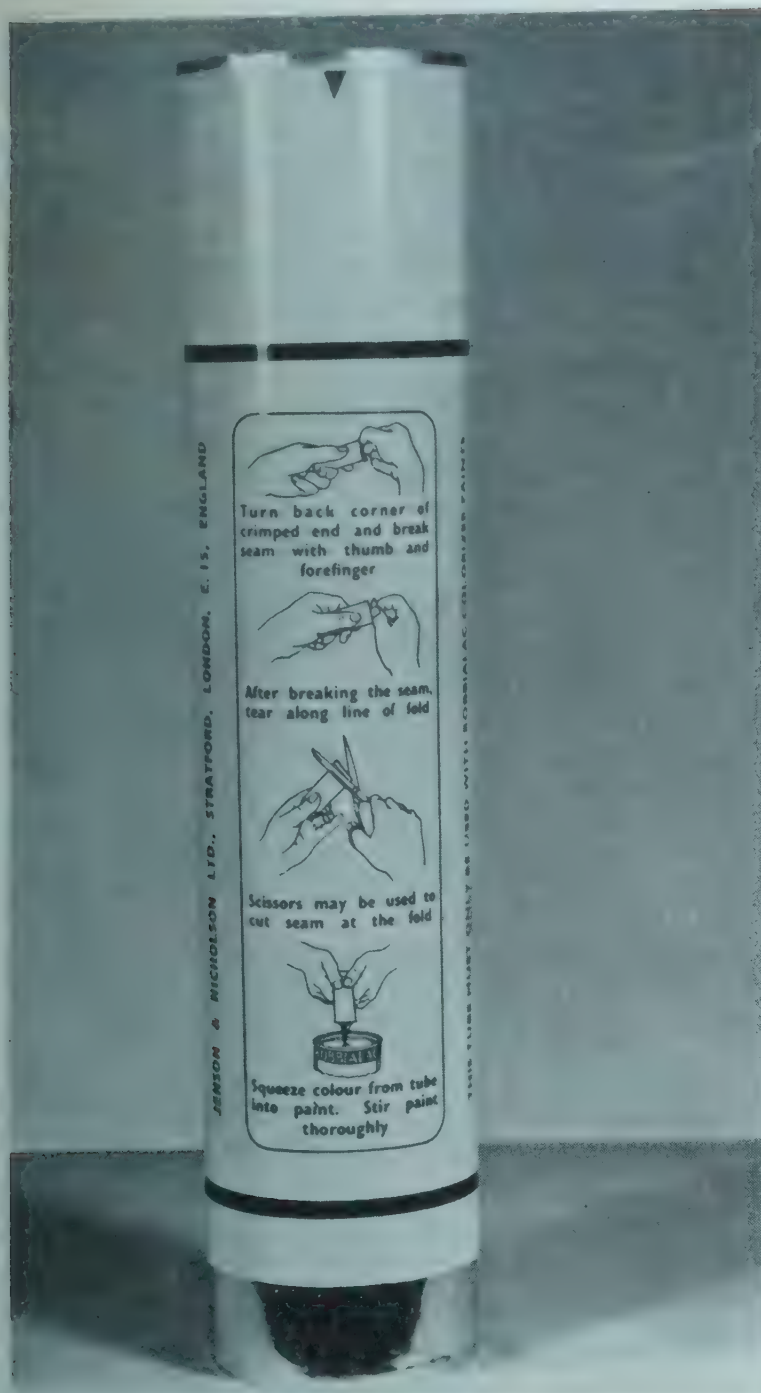
As a result of recent technical advances, aluminium collapsible tubes are available with a thin metal membrane closing the nozzle orifice, and ultrasonic soldering techniques enable the crimped end of the tube to be hermetically sealed. If the food packager wishes to avoid the expense of an ultrasonic welding attachment, manufacturers can supply tubes coated at the end with pressure sealing or heatsealing compounds which will give an hermetic closure with conventional types of closing machines. The product is thus safe from any form of contamination from the time it leaves the factory until the last portion of it has been used by the consumer.

The majority of food products react when in contact with aluminium, but collapsible tubes, internally coated with a highly polymerized stoving lacquer having exceptional chemical resistance, prove completely satisfactory against all but the most difficult types. One coat of lacquer is normally sufficient to give complete protection, and the protective coat extends over the whole interior surface of the tube, including the shoulder and the nozzle. Where the packaged product tends to attack aluminium strongly, it

has been found that two thin coatings of lacquer, which may be applied for a very nominal extra cost, afford better protection than one. Non-destructive electrical methods of testing have been developed by tube manufacturers enabling a constant check to be kept on the quality of the internal coating, which naturally cannot be inspected by visible means. Among the long list of food products whose physical character and circumstances of use make them ideally suited for packaging in tubes are icing sugar preparations, honey and sweetened condensed milk; these are safe in contact with aluminium, although the precaution of conducting shelf life tests must always be taken. It has been found that certain products of animal or vegetable origin may vary in their behaviour when compared with honey derived from flowers in much warmer parts or climates. It is those foods which, because of their salt, sugar or vinegar content, do not support bacteria or mould growth, that constitutes the major portion of the tube packed foodstuffs at present being imported into this country from the continent. They include meat extracts, yeast extracts, jams, sweetened condensed milk, honey, icing sugar, chocolate spread, syrup and certain varieties of sauces and mustards. Where it is desired to pack products of a less stable nature requiring some measure of sterilization, each case must be considered upon its merits since there are limitations to the treatment which the decorative finishes on a collapsible tube will stand. The



Aluminium tube incorporating nozzle with star-shaped orifice also octagonal and round caps.



Tube packaging showing instructions for usage of contents.

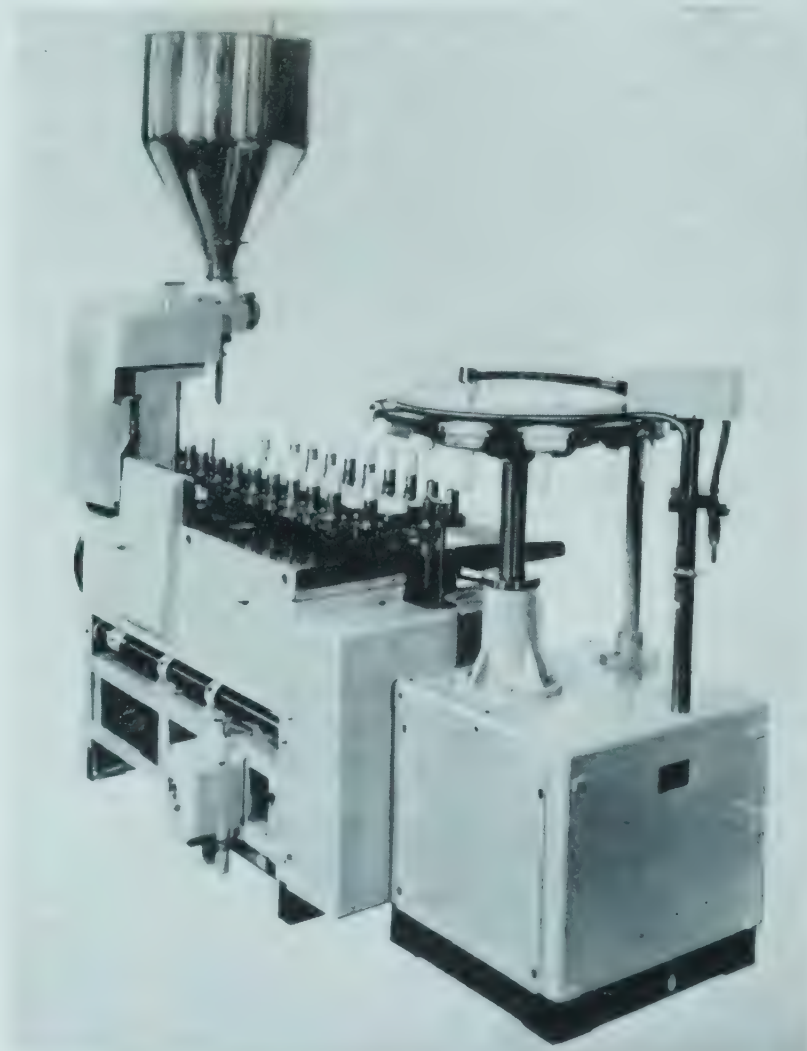
manufacturers of such tubes are always willing to advise prospective tube users as to the correct type of tube to use and will always suggest enamels, inks, caps, cap-liners and protective internal lacquers. Liaison of every kind in new packaging projects is most important and it must always be stressed that first-hand advice should be sought and is always available concerning the suitability of any types of container the packager may have under initial consideration. Tube manufacturers are also prepared to offer advice on preservatives or methods of sterilization and will, at the same time, carry out shelf life tests and other accelerated tests in parallel with the packager's own laboratory.

In order to comply with the regulations governing packaging, it is necessary that all packages, labels and seals carry statements of the minimum nett weight of contents, the packager's or manufacturer's name and trading address, the formula or a statement of the packaged ingredients. The

collapsible tube offers perfect facilities for meeting these necessary and important requirements while presenting the product not only in a compact and convenient form, but in such a way that eye appeal while the product is on display will be assured.

Fool-proof Filling Processes

The filling of food products into tubes presents no difficulties. The modern filling machines now available range from small hand-fillers and their attendant folding and crimping machines capable of a production of 25 to 30 gross per day, to fully automatic machines working at the rate of over 50 tubes per minute, or approximately 150 gross in a single day. The choice depends entirely on the volume of production required relative to sales outlet and at the same time, costs are much lower with the fully automatic plant than with the hand-operated machines for which at least two operators are required. Apart from food filling, such machines now available have been used for many years filling antibiotics and other fine chemical and pharmaceutical products. All parts coming in contact with the product being packaged or filled are of stainless steel or Monel metal thereby ensuring that no metallic contamination can take place. Hot filling is also catered for by the provision of hot-water jackets to the hopper, or the machines may be adapted to fill directly from the cooking or sterilizing vessels. A wide



Arenco tube filling machine used for pastes, mustard, mayonnaise, etc.

variety of machinery is available and specialists produce suitable plant for a specified product. Small hand crimping operations will require a folding and crimping operation to the tube after filling while the automatic machine will fill, close, crimp and eject the tubes in one operation and is normally provided with a conveyor belt on which the filled tubes are cartoned, packed or otherwise prepared for despatch. One filling machine on the market, the 'Arenco', can make six different types of closure by means of multiple folding stations. Among the foodstuffs for portioning and filling for which it can be advantageously used are caviare, food pastes, flavourings, fillings for meat pies, mayonnaise, mustard and household cream. Other machines have facilities for filling designed to link up with existing factory lay-out and methods of production.

Delicacy of food presentation is now established on the continent among other countries and daring and adventurous use is being made of the many new packaging materials now becoming available which help in the better presentation of foodstuffs for the home and hotel use. Britain's housewives are most eager to obtain those delicacies, often seen only during holiday visits to the continent and to enjoy foods in these new packaged forms. Britain should not be lagging behind in such forms of food presentation but should endeavour to capture lost markets by ingenuity and adaptability of material so readily available.

Two hundred years ago, Britain was famous for good food. The roast beef of old England was known not only in the length and breadth of England but from St. Petersburg to Seville. It has only been the advances made in the continental kitchens by the French and the Italians and their master chefs that have produced a reputation that has attained and passed that of this country. However, Britain is fast regaining the renown she once held among the world's epicures and the food packager can further advance such claims by bold and new steps in packaging projects.

Bottle and Jar Closures

Filling, labelling and closing are all part of the process of packaging food and beverage products for market presentation, display and point of sale appeal in the hands of the retailer. The modern sealing method for glass containers is the made-to-measure fitting closure designed to fit individual bottles and jars. The closure must do justice to the product, the presentation and the label. Colour and style of bottle and jar cap today may be said to be worthy of most products, but some of the plainer types of bottle cap could be improved without adding very much to the cost but much more to eye appeal value. The bottle cap is probably the least expensive item of the package; it can in many cases be the first impact upon the customer. Often the bottle has to be opened and closed to be re-opened again. A worthy cap helps to implant the name of the packager and his product upon the buying public long after the contents have been used. Poor closures are not only unattractive but are bad marketing policy. What is termed the 'R.O.' or rolled-on type of seal is, in fact, virtually rolled-on to the bottle, the screw threads on each bottle acting as moulds for similarly placed threads on the actual caps. In this way, the cap may be said to be made to measure. Famous brands of foods and beverages are becoming known at home and abroad by their smart and colourful caps. The R.O. type of seals are made with either beaded skirt or with a pilfer-proof, perforated security band at the base of the skirt. All these seals are made from pure aluminium sheet, externally finished or decorated in colour to the selection of the packager to match in with his colour or marketing product scheme. They are coated internally for product protection and lined with a sealing or bottle cap paper medium suited for the contents of the glass container and the packaging conditions. The range of sealing machines for hand, semi-automatic or fully automatic operations, also includes models for vacuum sealing, and it is interesting to note that the R.O. type of seal is the only screw cap closure



Some well-printed bottle and jar closures.



A variety of aluminium closure caps.

which can be applied under vacuum. While standard caps of all kinds are readily available, tailor-made types may be evolved to suit special requirements or modifications may be made and this again is a matter for enquiry. Laboratory and development engineers in most cap manufacturer's plants are available for the solution of any special problems.

Cap or Seal Application

The method of application is simple. When the filled glass or other type of container reaches the sealing machine, a cap is dropped over its neck, either by automatic means or by hand and the container is placed, again either by hand or other methods, under the sealing head of the machine. Head pressure is applied, usually between 200 to 300 lb. firmly embedding the sealing face of the container into the sealing medium lining the cap. The seal having been thus effected, head pressure is maintained while spinning rollers, under an adjustable spring leader, bring side pressure to bear on the skirt and mould it to the thread on the neck of the container. From the moment that the cap is dropped into position and sealed by the application of head pressure, it remains stationary, and the sealing medium does not revolve over the sealing face of the container until the cap is removed by the user or consumer. A perfect hermetic seal is thus obtained and the possibility of damage to the sealing medium is avoided.

This medium of application also applies to the pilfer-proof type of seal which is similar in design, with the addition of a device to deter pilfering. The pilfering seal, although supplied to the packager in one piece, actually comprises two parts. The top portion, after application, forms a screw cap and the lower portion a security band. These two parts are held together along the perforated line by a series of small bridges which fracture when the seal is opened. This seal is applied on the same machine as other types of caps or seals, but while the thread is being rolled, lower rollers tuck the skirt of the cap under a projecting band on the neck of the container, below its threaded portion. Pilferproof seals cannot be opened without showing some evidence of tampering because the lower ring drops down the neck of the bottle as soon as the cap is unscrewed and the bridges

are severed. The threaded portion of the cap can, of course, be used as a re-closure in the ordinary way.

First class machines are now available for cap or seal application and these machines are supplied on moderate rental terms in some cases. Periodic inspection is carried out by the makers.

Sealing Medium for Caps or Seals

The liners assembled into the caps vary according to certain factors relative to the product being packaged and sealed. The conditions under which sealing takes place also have an influence upon sealing media. Advice may be sought on this aspect of container sealing with caps. In the ordinary way, liners are of the duplex type, comprising a sealing medium, to secure a satisfactory seal, and a facing material for product protection. The interior surface of the cap itself is usually coated with a protective lacquer or enamel providing both added protection and improved appearance. Here are some of the main sealing media and tests should be made in order to determine the most satisfactory liner and facing for the product concerned:

A. *Sealing Media.* Waxed agglomerate cork or resin bonded cork disc, to which a suitable facing material is laminated or adhered.

B. Waxed pulpboard to which a suitable facing is adhered.

C. Rubber or synthetic rubber wad with aluminium backing discs.

D. Flow-in rubber ring—for larger diameter closures.

E. Flow in flexible gaskets prepared from synthetic resins and allied products.

1. *Facing materials.* Varnished paper—ceresin, blackol, resistol, etc.
2. Vinylite coated paper.
3. Waxed paper and board material.
4. Transparent paper or filmic material.
5. Tinfoil.
6. Aluminium foil and foil laminates.
7. Lead foils.
8. Plastic facing discs or films based on synthetic resins, for example, P.V.C., Polythene, etc.

Sealing under Special Conditions

The R.O. type of seal is used successfully on packs which are sealed hot or in cases where the pack is subject to pasteurizing or sterilizing conditions after the sealing process has taken place. The decorated finish to the cap is, in this instance, designed to withstand this process. Where it is advisable to seal under a vacuum, the R.O. is the ideal closure as it is the only form of screw cap which can be applied under vacuum. Special vacuum sealing machines are available in semi-automatic, fully automatic and other styles. Climatic conditions in the country to which sealed products are exported, as well as the actual composition of the product itself, must be taken into account when selecting the appropriate closure and sealing medium.

Preformed screw caps of the screw threaded type are available in a large range of sizes for all types of containers and products. A choice of sealing media is also available and exterior decoration is supplied to customer's requirements.

Reference has been made to sealing machines for use in conjunction with various types of seals and caps and these operate at various speeds. From 900 to some 7,500 per hour is possible according to type of machine. The existing washing, filling and labelling plant has some relationship to the type of machine employed for the purpose. Automatic models are almost fool-proof and permit smooth flow of sealed containers on the production line. Precision timing in transfer of bottles ensures the minimum glass breakage. Bottles and jars which are to be sealed by various methods must have the finish or threaded neck made to the appropriate specification—the size of the seals used depending on the dimensions of the body of the bottle. Sample bottles should be submitted to the seal and cap maker in the case of the new type. The tolerances are well within commercial limits in all cases.

Metal Printing

The tendency to produce metal boxes of an even more decorative kind is on the increase. Many such colour printed boxes have a definite after use appeal in the home of the consumer so that the packager's product and name may be remembered long after the contents of the box or casket are used. Some very charmingly printed, designed and styled metal boxes are now to be seen in the stores containing food and allied products.

Considerable progress has been made in recent years both in printing inks, press precision and general craftsmanship resulting in the highest degree of beauty in decorated metal containers of many kinds. Colour printing and metal decorating presses of the 'Crabtree' type have recently been introduced for the specialist printer so that many new applications of this packaging medium are now possible. Production speeds have been stepped up with ease of operation and material handling for the operator. A new metal decorating press has been built by the same maker designed to reduce the number of stovings required and metal decorators say that they are now printing two colours at one operation, with one stoving, which only a matter of a year or two ago would have been considered impossible. In

printing heavy solids, for example, two printings are often involved in the process in order to get the depth of colour required. By using facsimile plates on current machines these solids may still be produced in two printings but only one stoving. This means cuts in printing costs. The registration between the two units is absolutely hair line. This machine will fill a place in decorative metal box packaging schemes. A sheet metal feeder recently developed is stated to be a perfect adjunct to the metal decorating press; it will run and feed accurately up to 6,000 sheets per hour in dead register. This operation is wholly automatic and the separation of the sheets is of the highest standard. Continuity of feed while replenishing feeder pile is also a standard feature of this machine. These feeders are also used for attachment to scroll shears, Gang slitters and other equipment.

Printing Processes

The packager concerned with the purchase of printed labels, seals, cameos, brand labels, wrapping papers, fancy papers, signature papers and gift wrappings, box tops, end labels and other printed work, may sometimes be faced with a choice of printing process where medium to large runs of printed matter is requisitioned for a packaging or labelling project. The printing process employed will bear some relation to the length of the run or the number of impressions required and naturally the type and quality of paper to be used. Here the label printer specialist will best advise the most suitable paper and the right process for the job. Designs, layouts, finished drawings, blocks or plates are all part of the printer's craft and where the packager is not staffed with personnel to handle such matters, some suitable studio or the printer himself will assist. Here it is proposed to give a very brief outline of the various processes of printing as applied to packaging materials; the *'Paper and Printing Manual'* and *'Paper and Board Conversions'* written by the author deal very comprehensively with both paper and printing. Paper plays an important part in any printing project so that it is important to know the paper, its surface and furnish or make up in order that the appropriate printing process may be employed. Clay coated papers such as art, chromo, enamel, surfaces, friction glazed, flints and other surface coated papers, give first class results by the letterpress process of printing where fine screen blocks and letterpress matter have to be reproduced.

It is often a common fault to set a price upon a job that has to help sell the product. Where costs are involved, it is far better to reduce the quantity and maintain quality.

The art of printing may be simply described as a duplicating process of taking copies in number from an original plate, forme, or engraving. The application of ink in one or more colours to paper surface reproduces the requisite number of impressions. The image from which the impressions are taken may be made of metal, stone, rubber, stencil commonly called blocks, plates or engravings. There are several methods of printing but perhaps here in brief one may assess printing as four main processes. The first, the ever popular letterpress process (the type and block being raised); the second is where the image is sunk and this process is called engraving, also intaglio or photogravure;

the third, when the printing image is level, the process being known as lithography in its various forms, and the fourth, silk or screen printing produced from a stencil through a mask.

No. 1 Letterpress.—This is the popular process known to print buyers and packagers of all kinds of products. It may be described as an offshoot from the original method of printing from wooden letters and poster work is still carried out along these former lines. It therefore resembles Caxton's first effort. Letterpress is used for label work, box tops, end labels, brand labels, recipe and hints leaflets, folders, price lists, catalogues, booklets and similar work. Black or monotone, or several colours may be employed. The finer the surface of the paper, the better the results, hence the need for a clay coated art or chromo paper for fine half tone screen block reproduction in colour. Printers will always assist in the choice of paper to fit the job relative to surface, finish substance or weight, the size being arranged to suit the shape or dimension of the ultimate job. Proofs are submitted to the author of the printed job for marking and correction. These are usually sent in black and white but colour proofs may be obtained for an extra charge.

Letterpress is carried out in the flat sheet from automatic feed-in machines while the latest large rotary plant literally 'churn' out long runs of printed matter.

No. 2 Intaglio or Photogravure.—This is a popular process for long runs of colour printing, the principle of reproduction is the exact opposite to letterpress. In the process of photogravure printing, the process is one where printing is carried out from etched surface the image being below the actual surface. In this case, the printing ink deposits itself into the depressions of the plate allowing the paper to take up the impression. The finest indents or markings on a copper plate will take up the transferred ink, so that many fine etchings, steel engravings, photographs and designs may be reproduced by this process. Where the run is long or speed essential, rotary machines are used, but some work is carried out on flat bed machines. This process is used for the production of box paper printing, signature papers, long runs for label and box top work, greetings, fancy wrappings, and similar work.

No. 3 Lithographic Printing.—There are several off-shoots in this process of printing, often referred to as flat surface, planographic or photo-litho processes. The litho method of printing as it is popularly termed, depends upon a somewhat different principle from the other processes. It is in fact a very ingenious method whereby the impressions are obtained from a perfectly level surface. It is based upon the antipathy of water and grease, and the parts designed for printing are coated with a water repellent recipe. The design is merely sketched on to stone or metal, aluminium or zinc, and neither is either raised or sunk as with other processes. The inks used in this process have an affinity for the greasy areas; therefore they are repelled by the untreated portions. These are moistened by rollers before they are inked, a sharp impression of the inked portion is thus transferred on

to the paper surface by pressure. Of all the printing processes, perhaps more progress has been made in this important field of print reproduction and much of this has a special application in food and beverage packaging, labelling, sealing, branding, wrappings, coding, marking, and in the final presentation of the product. As packaging has now been accepted as part of the process of manufacture, printing is a most important adjunct to packaging itself.

Photo-litho techniques have very largely assisted in the more rapid production of printing plates. This process combines high quality printing with rapid output. The offset process is one which gives mellowness to the finished printed work, and its softness without glare is often remarkable. Specially finished papers and boards are employed in litho processes and here again the printer specialist can advise.

Collotype is also an off-shoot of the litho process of printing and is rather similar in general principle except that the matter is printed on to a surface of thick plate glass coated with a light-sensitized gelatine. Richness of tone on a large variety of paper qualities is a special feature of this process. The production is faithful in detail and colour tones. The various processes of litho printing gives slightly different results and they should be studied in order to determine the best choice of printing process for the job.

No. 4 Screen or Silk Screen Printing.—This process, formerly carried out by hand methods is now mechanized and the process thus becomes a practical proposition for small to medium printing jobs in several colours and at the same time, part of other processes may be combined to give effect. For example, printed matter may be separately carried out by letterpress, colour work and design being added on another machine by screen printing. Screen printing is carried out by using a fine silk screen, made up stencils are placed in frames of metal or hardwood and the colour is forced through the silk web with the aid of a squeegee of strip rubber. This gives a full bodied impression. The process is repeated with the desired number of stencils which go to make up the job, all of which have been previously prepared. Mellowness, rich colour renderings, small runs on glass, transfer papers, board, wood, card, paper or other material are some of its outstanding features. Fine letterpress may be reproduced by this process so that label work and label design is possible on glass, tin and paper. In relation to speeding up the process, current automatic screen printing machines can print well over 1,200 copies per hour and this could be increased to 2,500 copies if fully automatic feeding methods were used. Designers are currently working along these lines. It could be a possible competitor to other processes of printing and is in fact more economical for short runs in several colours. Silk stencils can be produced photo-mechanically and the finished results include the reproduction of exceedingly fine lines and screen work. The employment of a highly concentrated dye or pigment paint results in a first class brilliancy which gives distinct advantage in colour work over other processes. Circular glass containers may be printed in full colour with colour design or brand name for the high class package and the fact that richness and reproduction of printing on many

kinds of unusual surfaces is possible, makes it a process ideally suitable for the high class food and beverage packager to consider in suitable schemes of packaging.

While some printed matter must be reproduced at a price, such as wrappings, cartons, boxes, it should be borne in mind that the well-printed label or wrapping, choicely designed and printed in full colour, can act as a silent salesman for the product while it is on display in the shop window, store counter, or on the supermarket when choice is quite open and may be influenced by colour and the brand label.

Printing Inks for Food Wraps.—There are no special regulations which relate specifically to the use of printing inks on food packages, although the general provisions of the 1955 Food and Drugs Act apply to any source from which contamination of food could arise. A booklet has been issued by the Society of British Printing Ink Manufacturers which presents the Society's view on what types of inks may be used on food wrappers. The Society comes to the conclusion that immediate wrappings for foods should not be printed with inks containing materials known to be toxic, inks used on external wrappings—those separated from the product by an immediate or surface covering, can be formulated from ordinary printing materials. However, it is suggested that ink makers ought to advise food packers that direct contact between printed surfaces and food itself should always be avoided. No inks should be guaranteed non-toxic. The Society also recommends its members to remind packagers of ice cream and iced lollies about the Food Standard Committee's report on the risk of contamination of these products with lead. Extracts from the Food and Drugs Acts and the Colouring Matter in Food Regulations are worthy of study by those who are concerned with this aspect of packaging.

In the booklet entitled '*Printing Inks for Use on Food Wrappers and Packages*', packaging materials are divided into four classes, i.e. external packaging, immediate wrappings, paper for wrapping frozen confectionery, and materials with a printed surface that comes into direct contact with the actual foodstuff. Varnishes are also mentioned. It is recommended that inks for external packaging may be formulated with conventional printing ink pigments without restriction, because of the low weight of ink used and the remoteness of this ink from the food itself.

Inks for immediate wrappings must be applied to the outside of the wrapper. Pigments, driers and plasticisers containing significant quantities of arsenic or lead should not be used in their formulation. Ink may contain some impurities in such cases. All printing inks may contain small quantities of substances classified as impurities and it is impossible, on a commercial basis, to manufacture satisfactory inks which in themselves would comply with the Colouring Matter in Foods Regulations, 1957, and the recommendations of the committees on lead and arsenic (which, however, relate to impurities in foodstuff contents). Immediate wrappers should be printed in such a way that set-off in the printing process is avoided ensuring that the surface in contact with the foodstuff is free from printing ink.

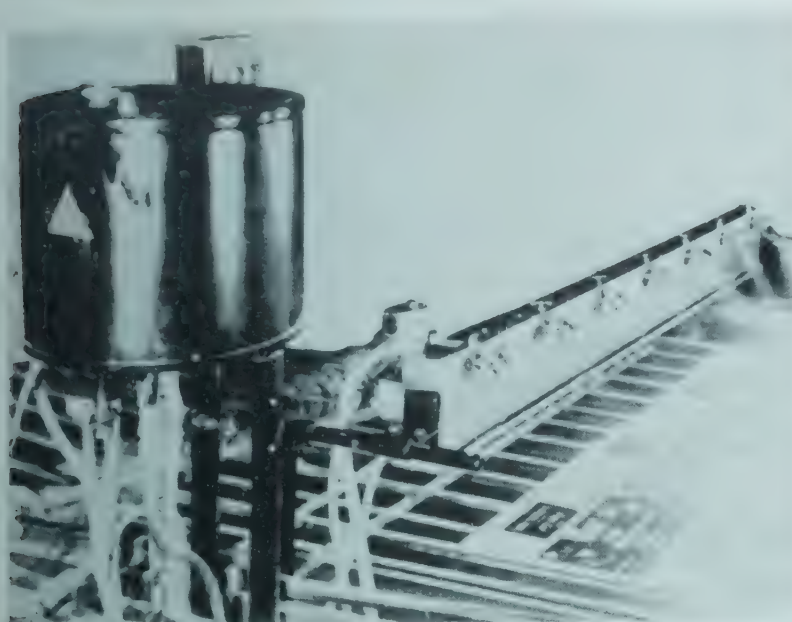
The Society states that while these precautions should be taken, any potential harm should be viewed in perspective. Ink films are minutely thin and the total quantities of ink involved are minutely small. Letterpress films are no greater than 3 microns thick and offset lithographic films do not exceed 2 microns. Gravure films may be somewhat thicker. It can be calculated that an ink with a lead content of 1 per cent printed over an area of four square inches, would add less than one half of one part per million of lead to a quarter pound packet of butter for example. If, therefore, the whole printing ink were ingested with the butter, the contribution of lead from the printing would fall below the recommended limit.

Ice cream and iced lollies present a special risk for appreciable quantities of the printed wrapping may be eaten by children along with the contents. The Food Standards Committee in their 1954 report on lead say—'We feel that the lead limit for ice cream and iced lollies should be put as low as possible having regard to the large consumption by children.' The wrapping of frozen confectionery therefore calls for special consideration on the part of the packager, the printer and the ink maker. In view of the need to keep the lead content to an infinitesimal minimum, packagers are advised to limit strictly the area of printed surface on the wrapper. Occasions have arisen where a packager has used a wrapper or printed insert in such a manner that the printing ink comes into contact directly with food. The Association points out that ink manufacturers' premises cannot be run on the lines of a food producing plant, precluding entry into the factory of any potentially toxic materials. The ink maker is in no position to guarantee the non-toxicity of his inks and should not do so. Printed surfaces, therefore, should not be allowed to come into contact with food. Varnishes applied to printed matter by any of the standard methods may be classified with ink in respect of recommendations concerning foodstuff wrappings. Any limitations on the use of inks are equally applicable to varnishes. The Society is of the opinion that varnishes do not constitute an effective barrier between printing ink and the food packaged from the standpoint of contamination.

The Yahnke Spray

The Yahnke wax spray equipment, for which world-wide patents have been granted, has been designed for the prevention of off-set, rub, scuff and mar in printing. It operates by spraying molten wax, which solidifies into small spherical particles before being deposited upon the printed sheet. These fine wax particles overcome the abrasive feel imparted by dry sprays and, depending upon board weight and amount of ink applied, it is possible to have loads of printed sheets at the press between two and five times higher than with powder off-set sprays, with an attendant saving in handling and storage space.

The wax particles have a lubricating effect on the printed surface which eliminates rub on filled cartons during transit, and increases output from carton forming machines. It has the further advantages that it prolongs the life of die cutters and cutting rules.



The Yahnke spray in operation, showing the wax reservoir and spray bar.

Over-printing with solid or line colours is not affected, nor does it interfere with machine glueing operations. With half-tone and screen printing dry sprays are used until after the final printing, when the wax spray is applied to provide a slip finish.

There are already several installations in this country operating with cutter-creasers and in the words of a user 'a long standing problem has been overcome'.

The Yahnke Spray is available for all widths of standard printing presses and spray heads with different aperture sizes according to the type of work and board involved. Off-set prevention on corrugated board for instance requires a larger wax particle than on lighter work. Portable models are supplied mounted on wheels, which can be used on varying press sizes by turning off the nozzles not required.

Specially designed 'Silk-in-Feel' waxes for use with the Yahnke spray are available according to the result required and the type of work. A 'Silk-in-Feel' wax can also be supplied to overcome slippage and give anti-skid protection in the handling of high piles of filled corrugated containers.

Claude Campbell & Co. Ltd., of London are the distributors for the Yahnke spray equipment in the United Kingdom, and will be pleased to supply further information. Plans for the manufacture of this equipment in this country are now under way.

Container Progress

Experimentation and research into extended uses and application of existing packaging materials such as film, laminates, impregnates, coatings, waxing continues without ceasing. At the same time, new materials are formulated for some special purpose. Among the outstanding examples of progress in these fields of packaging are the following:

Diotite.—This is a revolutionary advance in cartoning. A frozen food pack which does not need an overwrap but is complete in itself is now being made by The Metal Box Co., being a printed, heat-sealed high gloss waxed carton. Its

outstanding points are convenience, reduced production costs, needing only one set of machinery. The Diotite carton is delivered flat for automatic erection, filling and closing on machines designed and built by the same company. The whole system (covered by patent applications in the major countries of the world) was developed after prolonged experiment and the first Diotite cartons containing Fropax blackcurrants and other food products are now on the market. The cartons are printed in full colour by the company's Lithesk process and with their heat-sealed flaps form a neat and secure closure when the cartons are filled; they are of very neat and appealing appearance. Other foodstuffs are likely to be packaged along these lines.

Laminated Foil Bags.—The use and application of the metal foil laminated block bottom bag will continue to grow. At present used for barbecue cooked chicken, they form a barrier against moisture, grease and heat while the package is being carried home. Printed in design and colour if desired, a closure may be made by folding over the top end of the filled bag.

Multiple Packaging.—What may be described as the key to future packaging in the field of canned products in particular is the handy multiple carton or pack known as the Carrycan. This is one of four types made by the Metal Box Company. Each type is produced in several sizes to hold differing numbers and shapes of cans. Some are made so that they may be packed by machine while others may be packaged by hand. The carton itself affords considerable scope in printing sales messages and brand names as full decoration may be applied. Some examples of these new packs are shown and include the Waveney pack which is printed in red and black, the Charrington pack printed in green and black and the special offer pack of real dairy cream printed in cream and dark blue. Convenient, handy for carrying away after purchase, bright and novel on display with colour and eye appeal, such packs can well form part of the future pattern of food and beverage packaging and marketing. No glue or staples are required for closure after packaging of cans.

Soft Drinks in Cans.—This method of beverage packaging can well develop with the introduction of suitable, convenient and practical containers. There are some striking examples of canned beverage packaging and among these are the Suncharm Ben Shaw's fresh orange drink package. It was devised and designed by this company and is being distributed currently in parts of Yorkshire and Lancashire, but it is hoped to extend the area. The 12 oz. cans, which fill two average sized drinking glasses, retail at 10d. each.

Whiteway's Export Cider is now being packaged in metal containers as is also Sweetheart Stout by Younger of Alloa. The most outstanding examples of letterpress printing in full colour with a high gloss finish makes an appealing pack for display and convenience. These cans are made by the Metal Box Co.

Pourer Spout Facilities for Drum Containers.—The new Armadillo drum container combines an outer steel drum

with an inner semi-rigid polythene liner thus providing more protective strength than the heavy glass carboy. Fitted with a patent pourer spout which may be taken out and reversed, the filled drums can be safely stacked. They have a varying capacity of 5 to 10 gallons and their double wall gives double strength. All parts are replacable; they are sealed when filled with anti-pilfer seal. An escape valve gives an outlet for excess of gas from within the drum, if desired, and special non-return escape valves may be supplied. They are used for conveying liquid foods and beverages and suitable liquids by all methods of transport and the outer drum may be suitably decorated with trading slogan and name.

Coloured Blown Opal Glassware.—Where certain high class kinds of foodstuffs are packaged with a view to gift purchase, consideration may be given to these comparatively new containers. At present, they are used in the cosmetic and pharmaceutical industries where glass inertness, stability, durability, eye appeal and visibility of product are selling factors. These new containers are being produced in quantity by special processes which help to retain stability of colour, uniformity of finish and it is interesting to note that bottles and jars in this field are now made in a variety of colours and designs. Food packagers looking for something new and novel for suitable product packaging, will find these glass containers will stand out on display. They also provide package designers with a new dimension in which to work and a very fertile field for their creative design in packaging talent. Some examples used in other industries of these blown glass opal containers are shown for general interest.

Can Seam Projector.—The Shadomaster can seam projector is a new aid to quality control on can production. It is claimed by the makers, Watson, Manasty & Co. Ltd., that the projector employs an inspection method which would be virtually fool-proof in the hands of the unskilled worker. The novel features incorporated in the instrument include a special surface illumination system providing maximum and variable light contrast factors, as well as the elimination of mechanical measuring facilities which might be subject to wear. One large food organization is understood to have installed a large number of these new can seam projectors.

Chambon's Cartoglas Printing Process for Carton Work.—Cheap grades of carton board may now be used in carton making in connection with a new process of gravure printed cartons and the finished results are comparable with those obtained on higher grade board material. As a result of the new Chambon Cartoglas process, inferior board stock is given a smooth and lustrous facing by the application of a layer of glassine printed and laminated to surface all in one operation. Carton work produced from the composite material is said to be cheaper in cost than high grade box board material. The improved appearance, surface and strengthening effect of the bonded glassine all help to produce a first class finished board for carton making. New machines are being made to produce printed Cartoglas board at an average rate of 200 feet per minute and the rate will be increased with experience. The equipment consists

of a gravure unit for printing in up to five colours and a laminator. Board material and glassine, fed from twin web or reel stock, combine at the laminator. The printed glassine, coated with a thin layer of adhesive or wax as it passes over a cylinder, is bonded to the board when the two materials are fed together between rollers. The finished board is then re-wound, cut to specified size sheets or converted into carton blanks by a cutter-creaser built on to the printer and laminator. Where a high gloss finish is required, the printed glassine surface may be treated with a coating of varnish on the equipment. At a slight extra cost, the printing on the board may be made resistant to rubbing. This non-rub finish is achieved simply by reverse printing transparent glassine, so that the ink is shielded from abrasion or scuffing. This process has been specially introduced and perfected with a view to using a cheaper grade of carton board, not only for home production but also for overseas application where inferior board material is in use and this applies particularly to eastern countries. Progress in this new field of carton make up will be awaited with considerable interest particularly in the food and beverage industries.

Packaged Product Visibility.—This is perhaps one of the most outstanding examples of package development. Established for some time in other countries, it is now making its presence felt in the British shopping scene. In the chapter dealing with wrappings, films are surveyed relative to their application in various forms of packaging. Windowed cartons and containers provide another way of viewing packaged contents either partially or as a whole, the product being kept free from dust, actual handling and moisture attack. There are many first-class examples of the windowed carton now being used for flour confectionery, biscuits, and allied products and among these the Elkes Choc-o-doodle Sandwich Biscuit pack is worthy of mention. The presentation of the product has an entirely new look and contains four foil-wrapped chocolate and cream sandwich biscuits. The frame of the pack is colourfully printed with an attractive design and reveals to clear view the packaged contents. On the reverse side, are space age cut-outs designed to interest the younger members of the family who often persuade mother to buy this or that brand as a result of immediate after-use appeal. In the chapter dealing with novelty packaging, new types of after-use, novelty and visible packs are discussed.

Reed-X-Cartons.—This new carton has been designed for quick erecting serving as a tray for food and confectionery. The carton is claimed to be stronger than the traditional rigid or stitched types of box. The carton is supplied flat for immediate erection by the packager. This current practice saves space and transport and handling costs. These cartons may be printed in several colours with specified designs. They are available in two styles, one with latex adhesive for assembly by hand and the other for erection by machine.

New Cartons for Butter Packagers.—As a variation from genuine vegetable parchment, greaseproof and aluminium foil laminates cartons are now being adopted by some butter



Decorated plastic containers suitable for fancy and high class products dispensed in small quantities.

packagers made specially for this purpose. Such cartons are self-erecting, where pressure on the side creases and locks the base quickly and firmly. Such a style of carton is suitable for holding large or small quantities and this is best demonstrated in the Adams Best-Pack which holds 7 lb. of butter and Superity English Butter $\frac{1}{4}$ lb. All of these pack designs have a fresh and hygienic approach and a novel technique is introduced in a new Four Pats presentation.

New Plastics-Top Stoppers.—Of special interest to the wine and spirit bottling trades is the new plastic-topped stopper produced by Viscose Developments Ltd. Combining the application of plastics materials, taking into account their hygienic advantages and eye appeal value, with the use of the traditional and established material—cork—and this with its attendant advantage of high resilience and high acceptance-value, the new plastics-topped stoppers have advantages which should appeal to bottlers and packagers of liquids. Thus, the Viskaps and Viskrings used in the distilling and bottling trades for spirits, wines and vinegars, in addition to soft drinks, can now be applied over plastic-topped stoppers supplied to them. The head of these new stoppers is made from polystyrene which is entirely unaffected by wines and spirits, and at the same time will not swell or shrink in excessive humid or extremely dry conditions of climate. The material is claimed to be completely odourless. A specially formulated adhesive is used for the bonding of the stopper-heads to the cork stoppers; the head cannot be broken except by breaking or splitting the cork. The design of the head allows for the cork being accurately centralized, and the internal flutes minimize the weight of

material used and reduce the cost while still maintaining an ample margin of strength. Brand names, trading slogans and other messages can effectively be incorporated in the moulding of the polystyrene heads. The most exacting trade mark in all its detail may be reproduced in this new form of plastic-top stopper.

Cadbury's New Poly-Tainer for Chocolate Syrup.—'Squeez' chocolate syrup is now being packaged in a squeeze bottle which combines efficiency with clean, controlled dispensing with all its marketing appeal and sales value. The new Poly-Tainer consists of three parts, the blown bottle moulded from non-toxic chocolate-brown polythene printed in white, a polythene dispenser spout and a white polystyrene cap. The colour of the spout and the bottle itself harmonize in all detail, even though they are separately produced by different processes. The dispenser spout is designed to suit a wide range of culinary usage and suit equally well. A small plug, moulded on the inside of the cap, fits into the spout aperture as an additional safeguard against the danger of spillage or likely seepage.

Packaging Exhibition and Design Contests.—All packagers concerned with the purchase and usage of every kind of material used for packaging and packing food and beverage products should make a special point of paying a visit not only to their own trade fair, but also to the International Packaging Exhibition currently held at the Olympia where a full panorama of materials, methods and machinery are fully displayed and demonstrated often for the first time. At the same time, the annual contest exhibition in connection with package design and styling is always worth a visit.

Glass Containers—Transfer Labelling

The application of coloured transfers in their various forms is considered as a permanent form of labelling. Transfers may be applied by using slide-off cellulose transfers or they may be of the paint or burnt in variety. The whole subject of labelling is fully dealt with in Chapter 3.

Containers—Their Shapes and Sizes

The growing tendency to introduce to the retail trader new sizes, novel shapes and multiple packs in food pack units made from all kinds of materials, often results in some confusion relative to a first class eye appealing window display.

Such an assortment of sizes and shapes of packages used by manufacturers does not always bring about harmony of display. One answer to this problem by the display man may be more frequent changes and mass displays of certain types of suitable products which go hand in hand. This applies particularly to the self-service stores where the retailer is often bewildered by such variations and in view of the limited space and wide variety of products to be displayed, there is always a tendency to favour the smaller pack. It does appear that some consultation could take place in the appropriate Trade Councils and Associations between manufacturers, packagers, distributors and retailers.

It has also been pointed out that the banded or multiple

pack has caused some considerable inconvenience in certain instances where the consumer invariably requires one unit only and the pack has to be split. These aspects of display and trading emphasize the value of the merchandising unit made from corrugated fibreboard material which may be used for both display and selling.

Containers should not be too heavy in weight as a very large percentage of female assistants find anything above 40 lb. unwieldy and difficult to move. The use of a Tear-tape gives opening facilities and has many advantages as opposed to the fastened down flaps which have to be slit or otherwise torn open.

Aluminium Sachet Manufacture

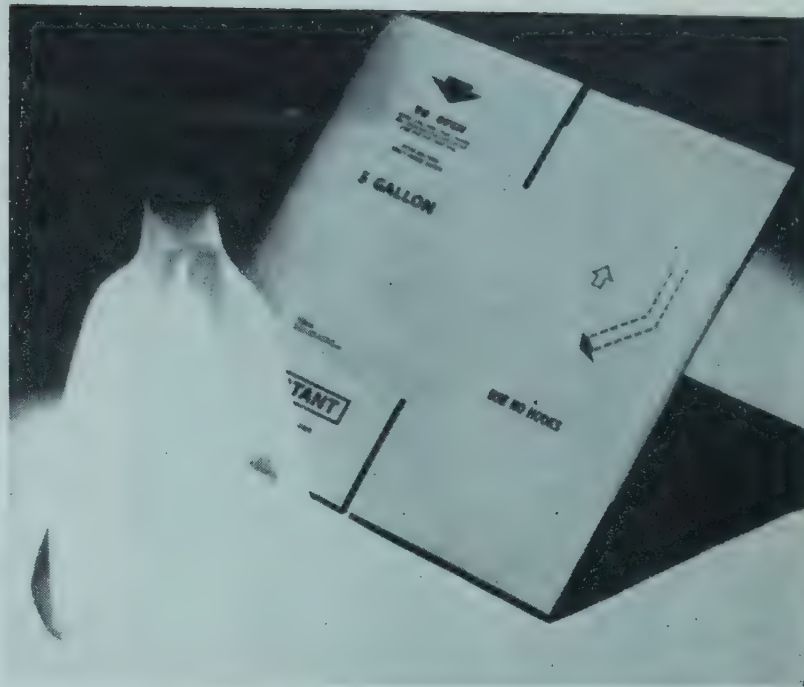
A new Chambon printing machine has been specially designed for printing sachets of various kinds, particularly those associated with the packaging of soups. The latest machine is capable of producing from a pre-laminated reel, 350 sachets per minute printed in multicolour by the photogravure process in conjunction with aniline or flexographic appliance for the purpose of frequent changes in advertising or foreign matter.

In the process of sachet manufacture the web of material is folded longitudinally the sachet being sealed six in one operation on the heat sealing equipment. The sachets are in turn cut on a rotary knife and delivered counted off in batches on a travelling band receptacle. The actual size of the sachet, number of printing colours and the style of edge crimping may be arranged to suit the packager's requirements using multi-laminated material.

The Cubitainer

A new packing case, produced as a result of co-operation between the plastics and the fibreboard making industries, has been developed and made for the purpose of packaging or filling with a wide range of liquids, powders and semi-solids in perfect safety and capable of emptying or dispensing as and when desired. This type of case is made under the name of the Cubitainer. It consists of a die-cut one-piece corrugated fibreboard case holding a semi-rigid polythene container. It obviously has a considerable use and application in the packaging of products produced in the food, beverage and allied trades. Reeds are responsible for the actual packing case outers which are converted by Iridon Ltd., the company within the Commercial Plastics Group which manufactures and markets the completed Cubitainer. The fibreboard material itself has been approved in principle by the British Transport Commission. Polythene itself is a plastic material with a combination of properties that render it extremely suitable for many packaging projects. It is quite free from tastes, odour and toxicity and is resistant to most chemicals, solvents and grease. It has an excellent tensile and impact strength, and a low moisture vapour transmission. It also remains flexible at very low temperatures. The completely welded seam of the Cubitainer inner gives maximum protection to the packaged product, and is, of course, liquid tight.

Iridon claim that, among this type of container, Cubitainer is unique in having a 'bespoke' fibreboard outer case,



Collapsed form of the Cubitainer.

which serves not only to protect and facilitate transport, but also to dispense its contents. As both the polythene container and the fibreboard case are collapsible, considerable saving of space in storage is possible and this is in strong contrast to the traditional type of metal, steel drum glass carboy, jar or some form of canister, in common use for such purposes. It is claimed, for example, 50,000 one-gallon Cubitainers, with the fibreboard outers folded flat and the polythene inserts nested, will occupy approximately 6,230 cubic feet and the equivalent space occupied by one-gallon glass jars would be some 15,600 cubic feet. There is no stacking problem with filled containers. Where transport charges are based upon the weight of a unit or consignment of merchandise, the new Cubitainer shows an advantage, for they are a quarter of the weight of steel drums and five times lighter in weight than the glass container. They are non-returnable, and they thus obviate returns of empties with all its book work and credits. There is no need for cleaning and reclaim plant.

The modern packing case maker from fibreboard corrugated material is geared to manufacture both standard and made-to-measure types of packing cases and some manufacturers have paid considerable attention to the specialized type of case; the Cubitainer is an example of this kind of packaging case specialization. In this instance, a sturdy case with the rigidity to complement the flexibility of the polythene inner container has been successfully devised. The packaged liquid contents are claimed to be free from surge inside the polythene, and the case itself is sufficiently strong to withstand internal pressure as well as to support the dead weight of the contents and afford protection from any likely external shock.

As is the case of all types of fibreboard packing cases or containers the smooth waterproof outer facings of the case may be choicely printed in colours to specified design and letterpress matter thus the manufacturer's or packager's name and brand is publicised for all to see while the goods



The Cubitainer assembled.

are in transit. Printed instructions or information relative to contents and the opening of the case itself, are also printed on the outside of the case. The necessary handling and opening up instructions are printed in every instance. These cases are die-cut during the process of manufacture in order to provide a perforated quick-opening release and this device is clearly located and marked accordingly. The release enables the flattened spout of the polythene container, which has been heat-sealed after filling and folded into the case, to be pulled out and cut open for the purpose of pouring out the liquid contents. The five gallon capacity Cubitainer also has perforations at the sides, which when pressed in, provide strong hand-grips for easy handling and pouring operations. In this size case, the outer material is made from double-wall board, giving extra strength and cushioning for the corresponding heavier contents. A small closure clip is supplied so that the polythene spout may be temporarily sealed if it is not intended to empty the complete contents of the case in a single operation.

It is also possible to utilize a specially but simple designed 'probe' or type of dispenser—whose spiked nozzle is jabbed through both the outer and inner containers and this allows the liquid contents to flow through a length of highly flexible plastic tubing equipped with an automatic spring-clip release.

The new Cubitainers have been on the market for only a few months but it is said that they have achieved considerable success in usage in various industries packaging liquids. At present, only five and one-gallon capacities are being made, but there is no doubt that further developments are being planned by the joint producers of these new cases. To date, these Cubitainers are being used for photographic developers, liquid fertilizers and dilute chemical acids. While the British Transport Commission has approved the use of the Cubitainer in general terms, application has to be

made for separate Railway Clearing House Certificates for each specific usage and this is because of the diversity of products with different chemical properties which may be carried in the new Cubitainer.

Among the active applications of these cases, in addition to those mentioned above, are various kinds of hand cleaners, dairy chemicals, battery electrolyte, 50 per cent sodium hydroxide, 45 per cent potassium hydroxide, masonry cleaner, flavouring concentrates, insecticides, adhesives, lime solvents, radiator cleaner, veterinary medicines and moth proofing chemicals. Further information relative to other liquid products which may be carried in these containers may be obtained from the makers.

This outline of the Cubitainer reflects upon the future progress of style and case application as opposed to the traditional forms of units packed in standard or similar cases. The made-to-measure special purpose packing case made from cardboard material is still in its early days of development.

Trade Association Notes

Food and beverage manufacturers, packaging managers and those concerned with the purchasing and usage of all kinds of wrapping and packaging materials, machinery and equipment used in conjunction with various food and drink packaging operations, do in many instances belong to their appropriate Trade Associations covering the special section of the food or beverage trades. At the same time, many packaging managers belong to the Packaging Institute where useful displays of current product presentation methods showing packaging in all fields may be seen and discussed with specialists.

The British Standards Institution formulate standards which are now accepted and adopted by packagers and packers relative to breaking strength, tensile strength, grip strength, wear, durability, resistance to moisture and water and other important aspects of the use and application of paper, card, wood, steel, adhesives and other materials used in packaging operations. The manufacturers of packaging material work to these specifications.

The Printing and Allied Trades Research Association, known as PATRA, is an organization dealing with research into printing, packaging and the application of materials used in conjunction with packaging in all its aspects. PATRA offers to their members advice and service relative to research and also a printing, packaging, paper storage, air conditioning, analytical, appraisal library and publication service to their members.

Their periodical reports deal with such important matters as packaging materials, cushioning, journey hazards, mould and insect attack, adhesive development, the cutting, creasing and converting of paper and board materials among many important research functions which have a distinct application to the food and beverage industries. PATRA has just published its Annual Report for the year 1959 and here is an extract relative to the service to its members.

'Printing Enquiry Laboratory.—The laboratory has had a very full year, the flow of enquiries remaining approximately

at last year's high level. Difficulties in the recruitment and training of sufficient new staff have unfortunately led to delays in answering enquiries, but a much better and more personal service is now being given. Up to the New Year, the laboratory had been responsible for all paper and ink testing, comprising about 30 per cent of the total number of enquiries received. This load has now been transferred to the new analytical department, and has enabled the enquiry staff to devote their full time and energies to the solution of members' difficulties and to the investigation of troubles on the spot. It is planned to increase the number of visits to members in difficulty so as to gather information and samples at first-hand. This usually leads to a much more satisfactory understanding between PATRA's staff and members, and it is known from experience that these visits are welcomed.

'Some of the laboratory equipment has been brought up to date, about £1,000 having been spent in the last year in this way. The latest I.G.T. printability tester and the new model of the Bendtsen smoothness tester are now fully operational. The laboratory's development of the damping and humidity expansion tester has been completed and several models are now commercially available. The Xenotest fading equipment has proved to be very satisfactory and has cut down by three-quarters the time taken to do lightfastness tests.

'Packaging Enquiry Department.—Once again during the year the number of enquiries answered by the department has totalled well over 1,000, ranging from determinations of the basic strength properties, moisture vapour permeabilities etc., of packaging films and wrappers, to the carrying out of laboratory simulated transport and climatic storage tests on complete packages to determine their suitability for various kinds of distribution systems and destinations.

'There has been a noteworthy increase in the proportion of those enquiries concerned with package testing, and full use has been made of the facilities provided by the package testing laboratory in the new extension to PATRA House, which was brought into operation at the beginning of the year.

'The package testing work has included not only examinations of fibreboard and timber cases but also several detailed investigations on metal drums of up to 45 gal. capacity. Of particular interest were the tests to compare the relative merits of drums fabricated from various gauges of steel and to assess the qualities of specially reinforced but lightweight steel drums compared with drums of standard design.

'The Packaging Enquiry department has also played a part in designing packs in addition to testing them. In those instances where initial tests have shown a pack to be unsatisfactory, work has been directed towards redesigning or making modifications to the package concerned to increase its protective qualities. On many occasions, the help of the department has been enlisted at the start to design a pack for some new or awkwardly shaped item or for one requiring special consideration because of its fragility. Items

such as glassware, tubular metal furniture, and electronic equipment, to mention but a few, have been satisfactorily dealt with during the year.

'The ever-growing popularity of self-service stores and the consequent increase in interest in packages and packaging materials for vacuum packing and frozen foods has been reflected in a corresponding increase in the number of enquiries received concerning the measurement of the gas permeabilities. The addition to the equipment of the department of a Frigidaire deep-freeze cabinet has increased the scope of the investigations which can be carried out on packaging materials for frozen produce. Determinations of, e.g. flexibility of films, heat seal strength, etc., can now be carried out at temperatures down to -30°C .

'Paper Storage and Air Conditioning.—It is perhaps not generally known that a service of advice to members on air-conditioning and paper storage is operated by PATRA. Members considering partial or full air-conditioning may find it advantageous to avail themselves of this service before the installation of plant. Alternatively, members already operating systems with which they are not entirely satisfied or needing advice on paper storage, may find discussions on the matter helpful. Some 25 such enquiries from members have been answered in the last six months.

'Analytical Department.—Before attempting to assess the progress of the newly-formed analytical department, it is perhaps advisable to indicate the purpose of the department.

'The department aims to serve, ultimately, in three ways: first, by conducting more of the recognized physical and chemical tests which may be requested by any of PATRA's members; secondly, by undertaking such analyses as may help the enquiry departments towards solutions of their problems; and thirdly, by developing such special analytical methods as may from time to time become necessary for the solution of problems encountered in the Research Programme. The department also aims to examine critically the current standard tests, and, where necessary, to revise and extend them to take account of the new materials which are being used in printing and packaging.

'The staff, equipment, and facilities for the fulfilment of all these aims cannot be produced and organized overnight, nor indeed during six months—the period during which the department has been in operation—but some progress can already be reported.

'Thus, requests for standard tests are being answered at the rate of up to 50 a month, a high proportion of the total enquiries received at PATRA. Further, the application of newer analytical techniques, such as chromatography and spectrophotometry, has given results which have helped towards a more reliable standard method for the estimation of glycerine in vegetable parchment, solved printing enquiry problems concerned with trace metal detection in cases of corrosion, and aided research studies on the effect of casein degradation on the printability of art paper.

'The department hopes to give increasing service along the lines indicated.'



FOR
ADDED
SALES
AND
EXTRA
SPARKLE

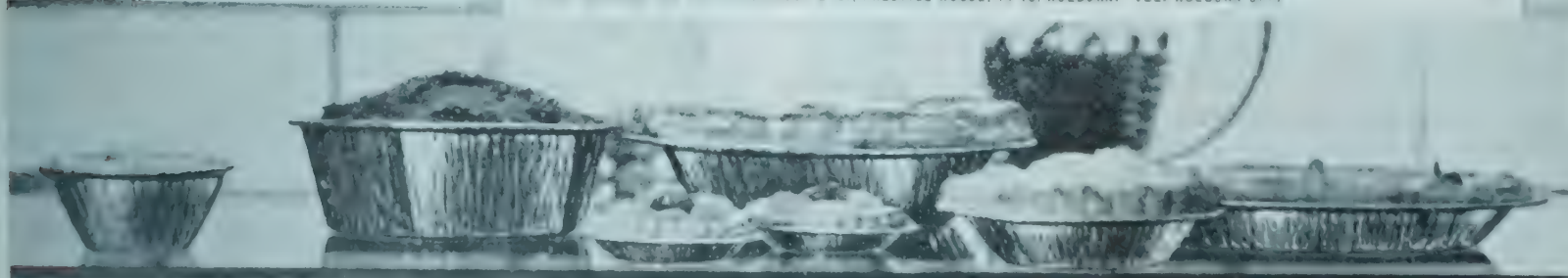
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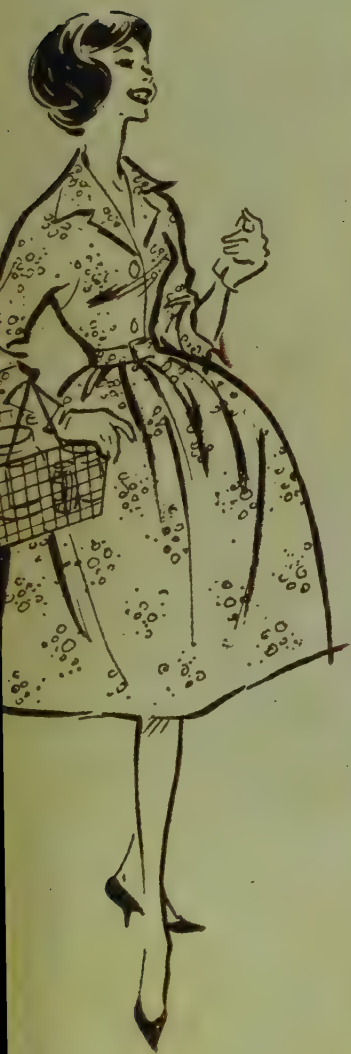


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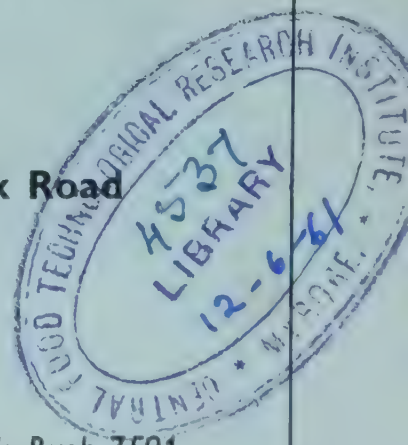
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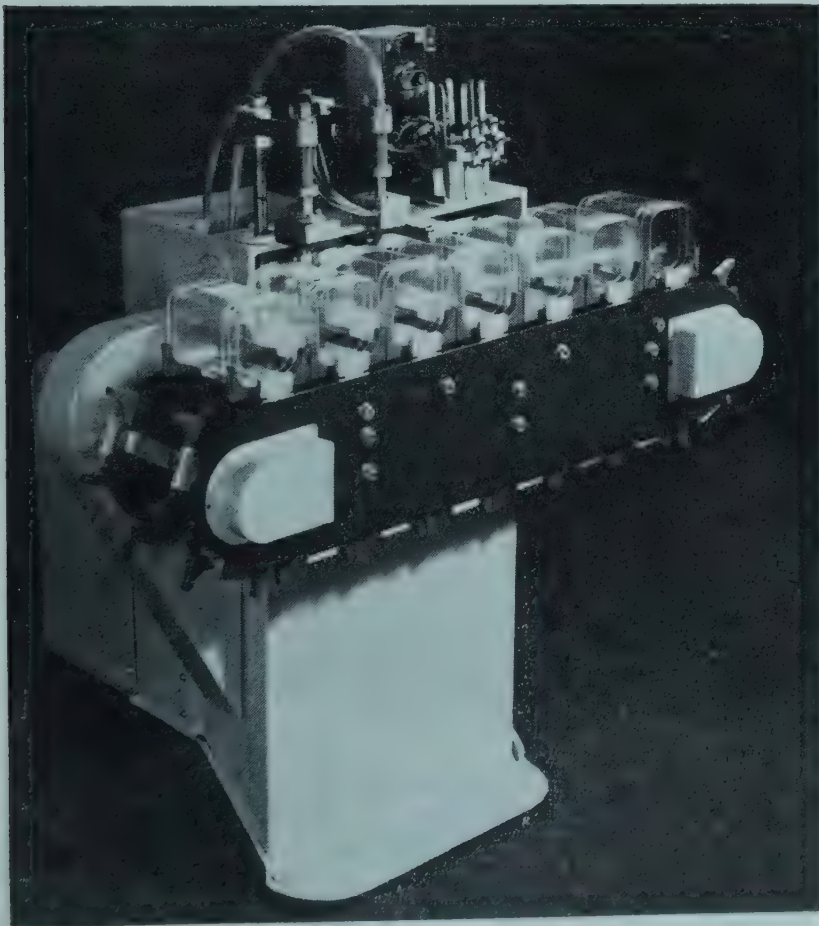
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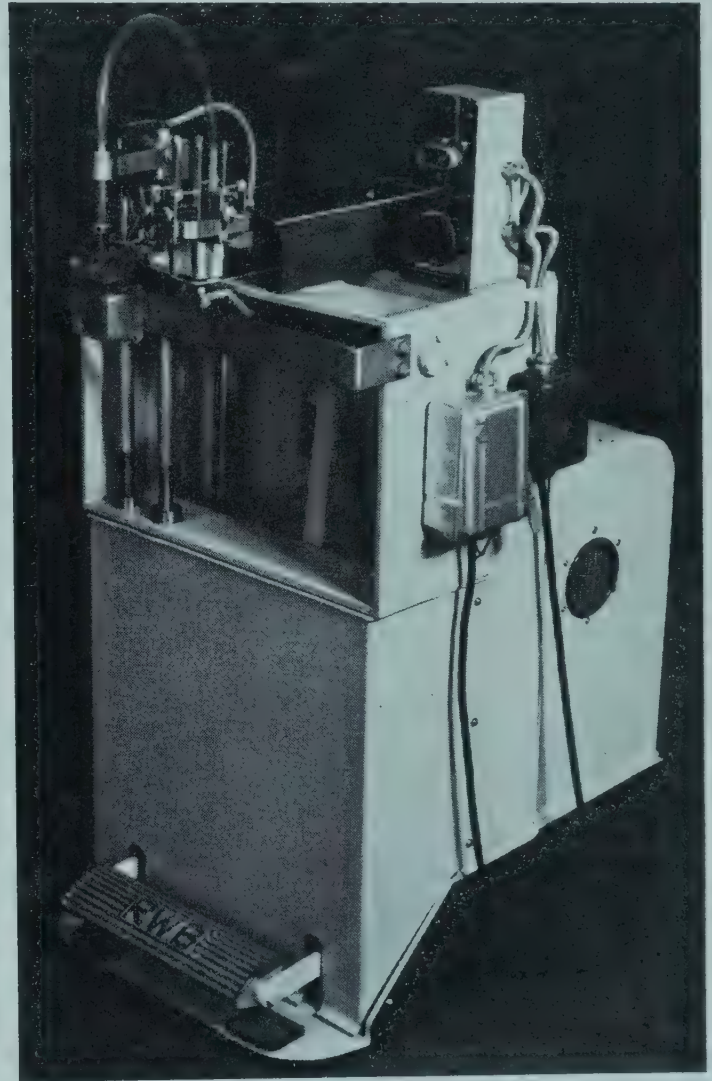
CHAPTER 2

Filling, Labelling, Capping, Wrapping and Packaging Machinery

ALL stages and processes of packaging the product are effected by modern British, American and Continental machinery developed by specialists who have long studied the various special problems and requirements of the packaging industry relative to filling, enclosing, capping, labelling wrapping and presenting the product for the market. Machinery of various types used in connection with all of these operations may be seen at the various Trade Fairs and at the International Packaging Exhibition and there can be no doubt that machine operational functions and speeds of output have been considerably increased due to the study of the problems in each special section of the packaging field. The manufacturer invariably sends groups of products to the packaging machinery specialist so that field tests may be carried out on various types of equipment appropriate to the operation involved in the final process of packaging the liquid, semi-liquid or solid product or unit for the market.



The Barraclough automatic heat seal labeller machine with conveyor.



The Barraclough header-labelling machine.

Progress continues to be made in the design of machinery of all kinds used by the packager of every kind of product so that shape, size, weight and style are fully taken into account.

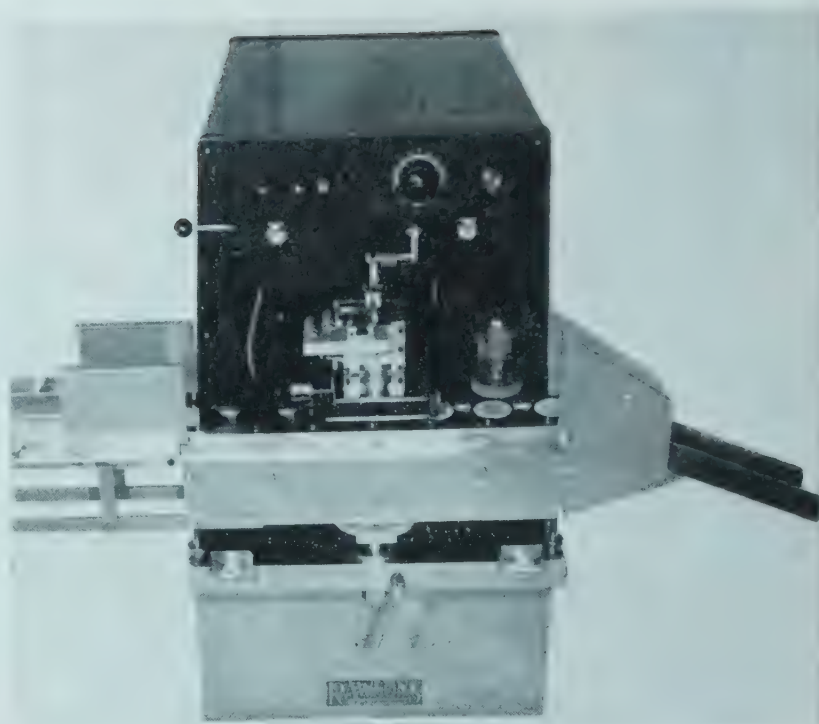
Some brief reviews follow of more recent progress and current practice in the various fields of machinery specially designed for the food and beverage packaging industries.

The Barraclough Automatic Heatseal Labelling Machine.— This is a new type of labelling machine that is simple, adaptable and claimed to be trouble-free. It is fully automatic or semi-automatic as required and may be used for bottles, jars, tubes and a wide variety of packs. It labels units at

speeds of up to 60 per minute, saving time and labour, and because of the absence of liquid adhesive, troubles caused by its use are eliminated. There is also the Barraclough semi-automatic type ALM machine which handles all kinds of packets, bottles and tubes at the rate of 30 units per minute. In both forms, machine change-over from one product to another is quickly and simply accomplished. With various adaptations, these machines may be used for all-round labelling of bottles, fancy panelling or for two- or three-sided work. There is a special device which feeds labels only when products are in position thus ensuring economy in operation. The design is sturdy and straightforward and the machine runs smoothly and consistently. The label magazine is adjustable and with a range of interchangeable magazines all sizes of labels up to a maximum of 5 in. x 4 in. may be handled. Magazines for special shapes are available to meet the requirements of packagers. For the purposes of heatsealing operations, temperatures are controlled by a variation switch which maintains the label heating block at constant temperature under full production conditions.

The Barraclough Header-Labelling Machine.—This is a simple, economical and adaptable unit specially designed for this class of bag sealing, enclosing or fixing. The machine fixes saddle labels on all kinds of bags and pouches and provides for a wide range of bag and label sizes. These labels add the finishing touches to the filled bags or pouches, most of which are made up from transparent viscose material with the contents of the pack fully visible. A hole for bag suspension may be made through the sealed label for the purpose of display; this is an optional refinement. The current way of displaying the header package is by some kind of display unit made from wire whereby the purchaser may remove a pack when required. This machine has a special application for the type of packaged foodstuffs sold via the self-service stores. It is equally able to deal with polythene and other types of films or foils handling the flat or gusset type of bags and the machine may be adjusted to deal with bags or labels of varying sizes. This unit will readily fit into the packaging line or can be arranged with an automatic feeding device to take the output from any type of automatic bag filling or closing machine. Hand fed speeds are claimed to be 30 units per minute but 60 units per minute are possible where feeding in is by automatic means. The label magazine is adjustable and with a range of interchangeable magazines, all sizes of labels up to a maximum bag width of 6 in. when closed, can be handled. Temperatures are controlled by a variation switch which maintains the heat sealing jaws at constant temperature under full production conditions.

The Rawson Perfection Heatfix Labeller.—There are two models in this range one semi-automatic and the other fully automatic. Either machine may be converted as specified for the purpose of handling various kinds of packaged dairy products but such arrangements have to be within the limits of the machine. In view of the progress made in heatfix or heatsealing papers in conjunction with the wrapping and



The Rawson Perfection heatfix labeller.

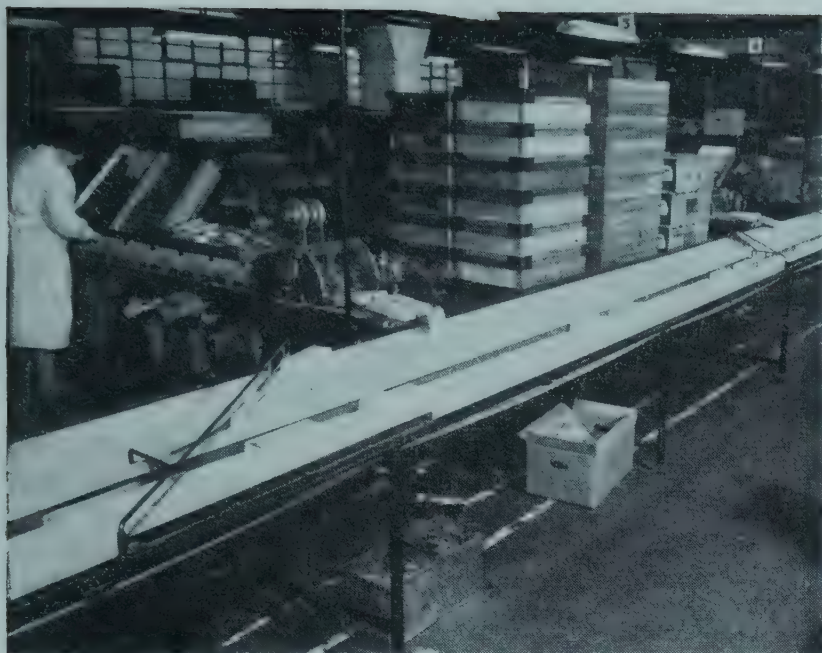
labelling of all kinds of products, the subject of machine design and application has been one which has made rapid progress and kept in step with the development of heatfixing films and coated papers in general.

The Universal Lassotaper Machine.—Self-adhesive or pressure sensitive tape in all widths and colours, both plain and printed, are being used in many packaging projects for sealing and enclosing operations. The illustration shows this machine in operation in the Huntley & Palmer biscuit factory at Reading and it is interesting to note that this company uses the Lassotaper for the purpose of sealing more than 20 different shaped containers. These units may be fitted into the production line and here a roller conveyor is seen.

Also illustrated is a section of the series of Lassobander



The Universal Lassotaper at Huntley & Palmer's Reading factory



Part of the section of Lassobander machines at Peek Frean's factory.

machines which have recently been installed in the London biscuit factory of Peek Frean & Co. Ltd. There are various types of sealing tape dispensers for self-adhesive tapes varying from the hand portable types to shop counter and factory bench models designed for sealing operations of small, medium to large proportions. The new hand dispensers have an application in the store where packets or cases may be opened and need re-closing or re-sealing.

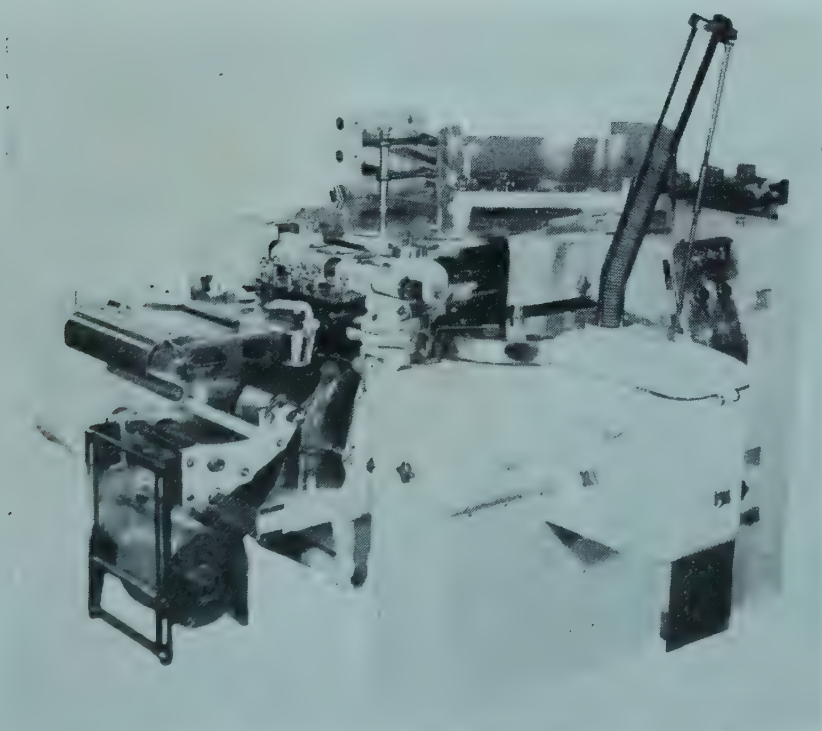
The 'Rose' Patent Class S.T.P. Wrapping and Labelling Machine.—This type of machine is designed to pleat wrap various kinds of food packs such as biscuits, pork pies and similar round packs associated with the food and allied packaging trades. The S.T.P. and M.T.P. wrapping and labelling machines are shown and while they have a special application for biscuit packaging, they may be used for

other types of food packs. These machines are adjustable for more than one size and can be arranged to deal with squares, ovals, or rectangular shaped packages of certain sizes. They will effectively wrap and enclose or seal in a moisture-proof viscose film and apply a thermoplastic heat-fix or heatsealing closure label at a speed of 60 to 80 packets per minute, but speeds produced on such types of machines must always vary according to the dexterity of the machine operators. At the same time, the product itself will have an influence upon speeds of packaging.

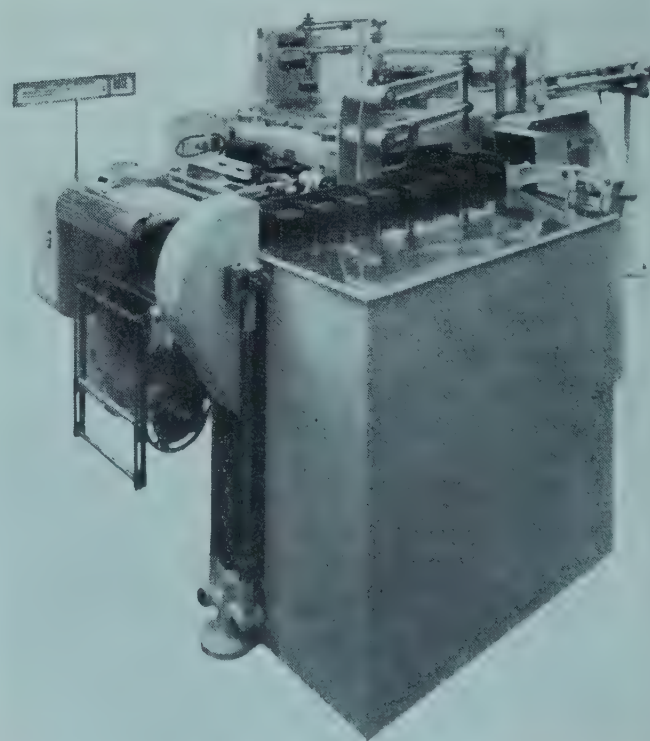
When the detector feels a pie in the feed plate the paper grippers pull the correct length of cellulose film through the paper knives. First the punching head punches out the two segments at each side of the wrapper and then the cellophane knife cuts off each wrapper. The paper gripper advances and secures the wrapper, and then retires with the wrapper to the pushup position. The pushup rises and at the same time the transfer drops to the paper line and the transfer rubber steadies the wrapper film on the top of the commodity to be wrapped. Then the commodity and the film sandwiched between the pushup and the transfer rubber ascends through the pleating brush and into the brush box.

The reason the commodity goes through the pleating brush is that the whole of it passes the bristles whereas in the case of the brush box the lower region of the commodity is untouched by these bristles the reason being that there is a gap in between the bristles and the iris on the bottom of the box.

The iris operating arm partially closes the iris shutter and this action prevents the commodity from falling out of the brush box. As it descends and moves clear of the brush box the iris operating arm completes its stroke and closes the shutters. At the next station on the mould wheel nothing happens but at the next stage the iris shutters are opened



Rose S.T.P. wrapping and labelling machine.



Rose M.T.P. wrapping and labelling machine.



Funditor cake wrapping machine.

sufficiently to allow the heater, with the thermoplastic label held on by the suction from the vacuum pump, to pass through the iris blades. The heater rises until the label has been pressed on to the pleated underside. At the same time the heater rises the sprung transfer arm descends on to the top of the commodity and applies a sprung pressure to help the thermoplastic label to adhere satisfactorily. As the heater descends the transfer arm ascends and as soon as the

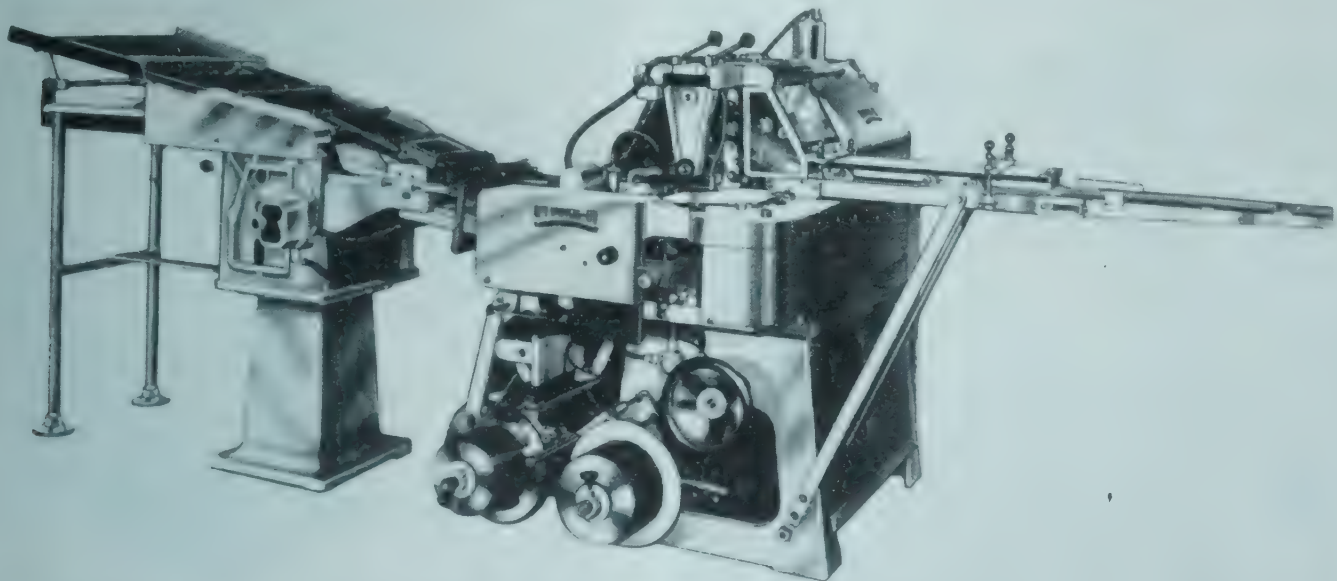
heater plate has applied a slight pressure on the commodity the suction is cut off.

At the next station the iris is fully opened, and as the pushout rises and the pushout transfer descends, sandwiching the commodity between them. The pushout and its transfer rise together with the wrapped commodity and place it into the rubber-lined jaws of the transfer wheel, and as the grippers take possession the pushout descends and the transfer rises clear of the transfer wheel. The transfer wheel moves two positions and on the second position the rubber lined grippers open and the wrapped package is deposited on to the continuously moving delivery belt.

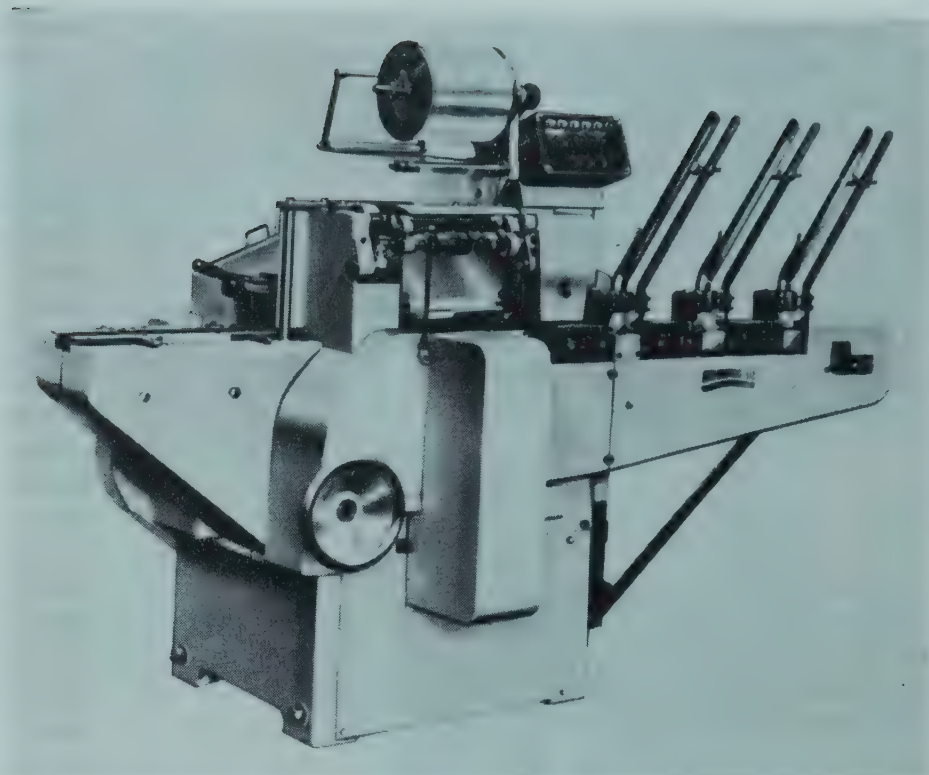
There are other machines in the 'Rose' range specially made for the purpose of pleating wrappings of transparent film, tissue, wax paper or parchment used in the packaging of pies, puddings, cakes or any similar cylindrical or rectangular food item, wrappings being fed from the continuous reel and punched out size. Machines incorporate 'No pie no wrapper' control device so that perfection in packaging is obtained. The wrapping is neatly pleated down sides and sealed on the top and bottom of the pack by an applied thermoplastic label automatically fed and affixed to a specific spot on the package. The final wrapped product is delivered on the travelling belt and an electric eye control may be fitted to machinery as specified to produce registered wrap. Other machines are available for applying gummed labels and others are interchangeable for either heatfix or gummed types of labels. Bottle labelling machines function in much the same way.

The Funditor Cake Wrapping Machine.—The new Funditor cake wrapping machine may be used for attractively packaging cakes of various sizes in filmic material. The application of heat forms the seal or closure to the finished package.

Roll Wrapping Machinery.—Particular mention must be



Type RH high speed roll wrapper handles all types of tablet, lozenge, boiled sweet, etc., and almost any pre-wrapped sweet of uniform shape at 120 wrappings a minute.

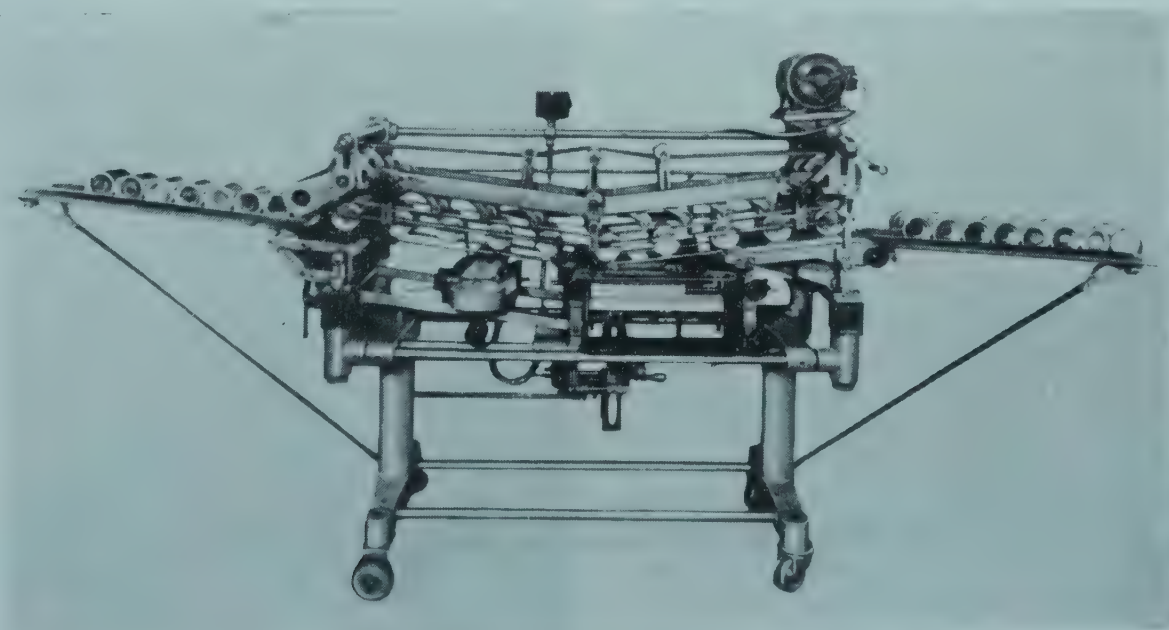


The type RB small pack wrapping machine for round biscuits. The output of this machine is 60 packs a minute.

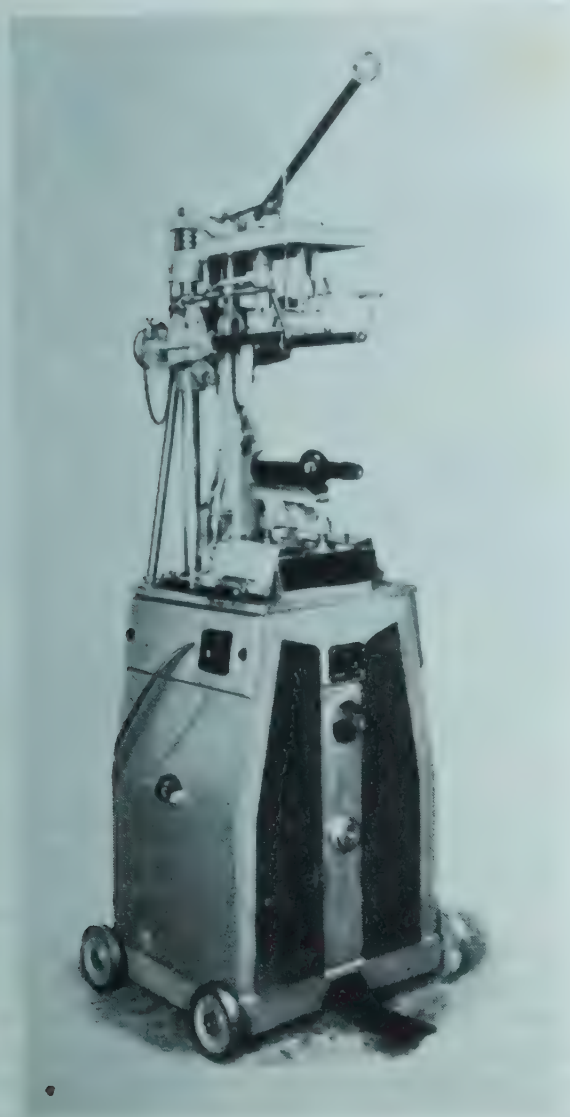
made of two new machines seen at the last Packaging Exhibition. The first is the type 'RH' high speed roll wrapper, manufactured by Auto Wrappers (Norwich) Ltd. It is designed to roll wrap all types of tablets, lozenges and many types of confectionery and boiled sweets and almost any pre-wrapped sweet of uniform shape at 120 wrappings per minute. The second, type 'RB', is the small pack wrapping machine made for round biscuits and similar food products. Made by the same firm, the output is claimed to be 60 packs per minute. Basically, the new RH is a faster version of the company's type R roll wrapper which has been universally used for packaging products of various kinds. The chief improvement is the incorporation of a seven-flight gripper on the wrapper carrier which compares with a four-flight gripper in type R. This gives faster action from paper feed to wrapping head and has allowed the speed of wrapping to

be increased to 120 wrappings per minute as compared with 80 to 90 previously. Automatic cut-out ensures that the machine stops operating should either sweets not be correct in number or wrapping material not be fed. The maintenance has been simplified by the inclusion of a larger gum bath and substantial bushes in all bearings, all greased from central points. The standard RH will wrap one size from $2\frac{1}{4}$ in. long and by $\frac{1}{2}$ in. diameter to $4\frac{1}{2}$ in. in length by $15/16$ ths diameter with $1/24$ th in allowance in diameter either way. For larger or smaller packs, the machine requires a rolling head which enables it to wrap packs ranging from $\frac{3}{4}$ in. to 7 in. long and up to a diameter of $1\frac{1}{4}$ in.

The Purdy 'New Way' Labellers.—This firm produces a range of high capacity, super-adjustable machines for round containers and the machine is shown labelling cans. This



Purdy 'New Way' labeller.



The Purdy bottle labeller.

machine is capable of operating at speeds of up to 500 per minute if necessary on cans up to size A2. On the other hand, they are equally efficient and economical at the lower speeds more generally required. The 'New Way' is claimed to be adjustable with built-in scales, requiring no tools and enables a complete change-over to be made in some two minutes to any size of can within their limits whether standard or special.

One of the range of 'Straightaway' labellers made by the same firm is also illustrated. Hand fed and automatic bottle labelling machinery is the speciality of this firm who have produced labelling machinery for many years.

Hunt's Dacan Machine.—A new machine recently demonstrated at the Packaging Exhibition is the Hunt's Dacan machine. This machine packages three 16 oz. units of canned beer in a printed sleeve. The hopper is being re-filled with printed sleeves while the completed packages are conveyed on a roller conveyor to the packing section. The prototype of an automatic machine designed to fill all sizes and shapes of heatsealable carton for many kinds of beverages, including milk, was introduced at a recent Dairy Show. Production of these machines are said to be in course of manufacture with change parts to handle cartons at speeds of 1,000 to 2,000 units per hour, the consistency of the liquid and the

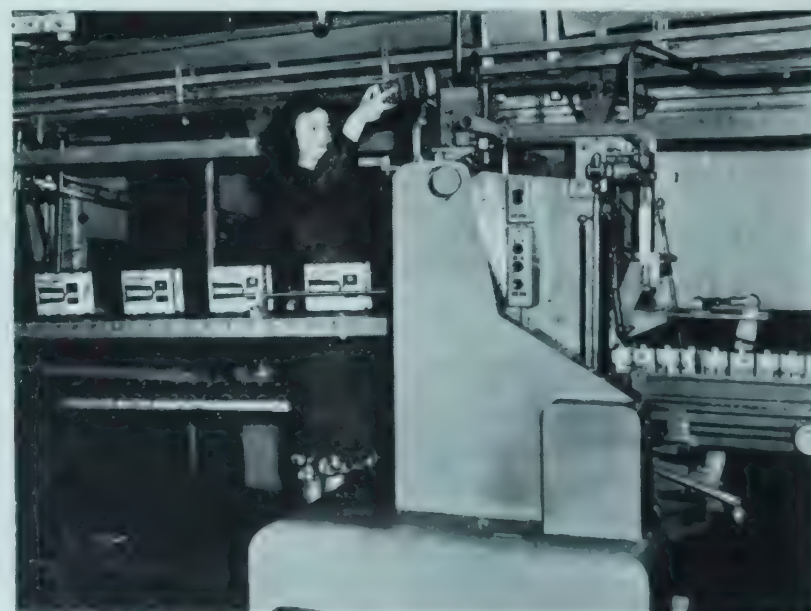
size of the carton having a bearing upon production speeds. G. Hopkins & Sons of North London are working upon this project and to assure customers of the accuracy of this filling head, each model will be made with a guarantee so that it comes within the limits of error laid down by the Weights and Measures Regulations. The machine handles the containers in pairs, drawing them from twin vertical stacks into pairs of metal cups on an endless conveyor, which moves the cups intermittently under the filling head and consequent top-folding and heatsealing stations. The carton magazines, filling head, folding and sealing units and the delivery table are mounted in line and served by one conveyor. The 'no liquid without a carton' is claimed to function on the filler and this machine can serve a useful purpose in the beverage industry.

The 'Beamor' Carton Erector and Packer.—A completely new packaging machine has been shown at recent Packaging Exhibitions made for the purpose of filling cartons with pre-packed products. This machine is called the 'Beamor' and is claimed to serve an important role in the process of carton filling.

It is a completely automatic machine capable of erecting, filling and sealing cartons in successive operations and can handle even the most fragile products: a prototype packing unit has been used by a firm of biscuit manufacturers to handle packets of cracker biscuits without damage to the contents. The complete machine consists of three stages which can be supplied separately:

1. Carton erecting.
2. Carton packing.
3. Carton sealing.

The carton erecting unit is loaded with flat cartons which are erected mechanically and passed along a conveyor to the packing unit. This unit can handle wholesale cartons up to 18 in. long x 12 in. x 12 in. Tickets can be inserted mechanically into the cartons on the way to the sealing unit which closes and then seals them on two seams, one on each side of the carton. A 9 ft. long compression unit effectively



Hunt's Dacan machine packing 3 x 16 oz. canned beer sleeves

secures the seals, holding the carton until the glue had dried and at the completion of this final stage the filled carton is ready for despatch.

Though great advances have been made in the field of wrapping retail goods for presentation to the customer, so that the majority of items on sale are packed by machinery, no major developments have been made towards mechanization in the task of putting retail packages into cartons for delivery to the wholesaler and retailer. It is the rule, rather than the exception, for cartons to be erected, packed and sealed by hand. The 'Beamor' is unique in carrying out all these operations mechanically, and its use means a considerable saving in labour costs, as the only manual operation for the whole machine is the filling of the magazine of the erection unit with flat cartons.

Some reference may be made to new machinery shown at trade shows in recent months in connection with bag forming, fold wrapping and sealing, stretch wrapping machinery and the following brief reviews describe new machinery shown and demonstrated by Bidex Engineering Co., of Keighley, Yorks.

'Vacubag' Heat Sealer.—This is a self-contained machine complete with motor-drive, air exhaust and air pressure units. Designed to form vacuum packs in heat sealing materials, and may be used for making bags from flat tubing. In operation, the open end of the filled bag is placed over an exhaust nozzle, a foot operated valve then controls pneumatic mechanisms which automatically clamp the bag, exhaust the air from the bag, and heat seal the opening. The sealing jaws will admit bags up to 10 in. wide, larger machines are supplied against specification. The advantages of this method of packing is that air which may contaminate foodstuffs, or air containing moisture which may be detrimental to the contents, is exhausted from the bag before sealing.

Fold Wrapping and Sealing Machine.—Cartons or solid

products may be completely fold wrapped and sealed in heat-sealing 'Cellophanes', waxed papers, or fold wrapped in foil, in one operation. The method follows that of the more expensive automatic machines but is simplified in design for the purpose of reducing capital expenditure without sacrificing the appearance of the finished product. The machine is adjustable for different size packs within specified limits. In operation, a predetermined size of film or paper is placed on a platform of the machine, the object to be wrapped is placed on the material, the fold wrapping and sealing is then automatic by lever operated mechanism. Among the advantages over hand wrapping are the use of smaller sheets of material and speedier operation.

Stretch-Wrapping Machine.—Particularly useful for wrapping objects of irregular shape. Gives a transparent skin-tight wrap for anything ranging from soap tablets to table poultry. Plioilm is drawn from roll and held between clamping frames, heat is supplied to the under side of the film which then becomes plasticized to such an extent that the article to be wrapped may then be pressed down into the film, twisted and self-sealed. The waste material is cut off by means of the heater. This is a simple, inexpensive machine which will wrap any shape of article within its capacity in an attractive skin-tight transparent film. Machines made to take 7, 9 and 14 in. widths of film.

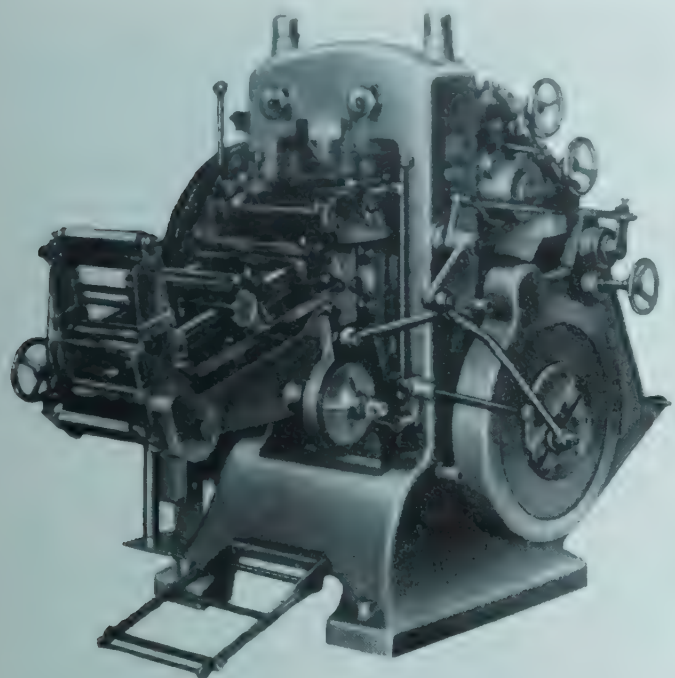
Printing, Seal, Embossing and Label Printing Machinery.—The large packager often has an interest in printing machinery used for the production of seals, tags, tickets, labels and similar printed work used in conjunction with packaging operations. Often plain bags are printed on the spot where frequent changes in design, letterpress and other matter are desired. While much of this work is the speciality of the printer and the seal producer, some packagers have their own printing department where certain work is carried out in connection with the mass produced packeted food product.

There are many excellent printing and converting machines of British manufacture but the recent machines produced and used in this country, by Sadolin of Denmark may be of special interest to the larger packager. One of these is the new two-colour 'Viking' Model 5 label printing and seal embossing machine. Another is the two-colour 'Sad-o-Matic' machine which is equipped for pressure sensitive and heatfix label production. A reel fed machine is now being used in many countries for the production of labels, tags, tickets and similar printed work used in packaging projects. A two-colour hand fed printing machine has been designed for printing ready made bags.

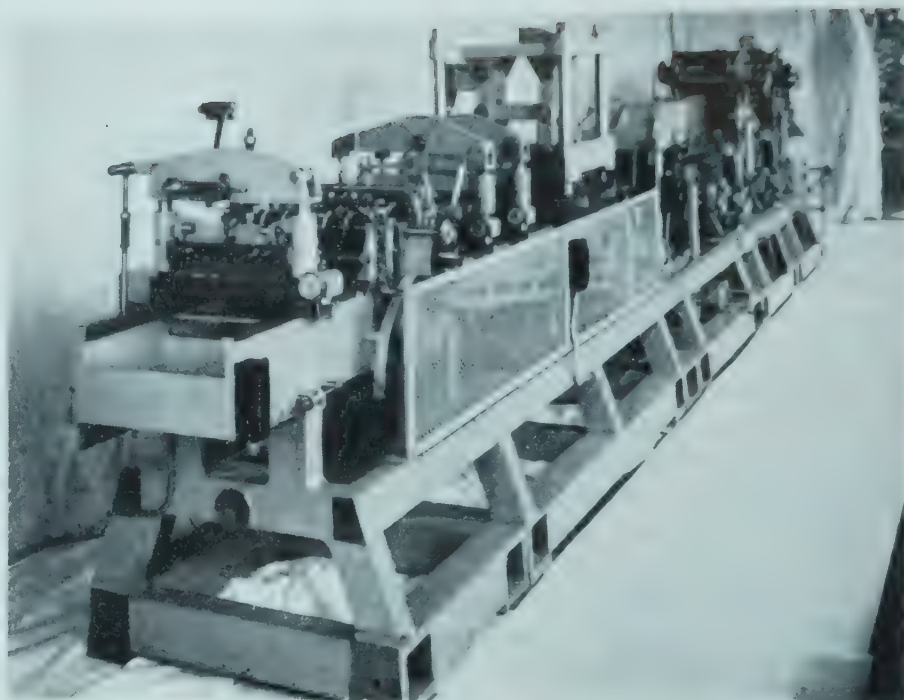
Williams Contact Plate Freezer.—This new device has been made for freezing fish, meat, fruit and vegetables in the quickest possible way. The product is frozen in bulk, or in catering or consumer packs, by placing it in trays between freezing plates. When the plates are closed by hydraulic pressure, the product is in good contact with the freezing plates, on both sides, this ensures rapid and uniform freezing throughout. The freezing times depend upon certain factors



The Topfix carton forming machine (Hunt Partners Ltd.) is capable of packing up to 300 cartons of fruit per hour.



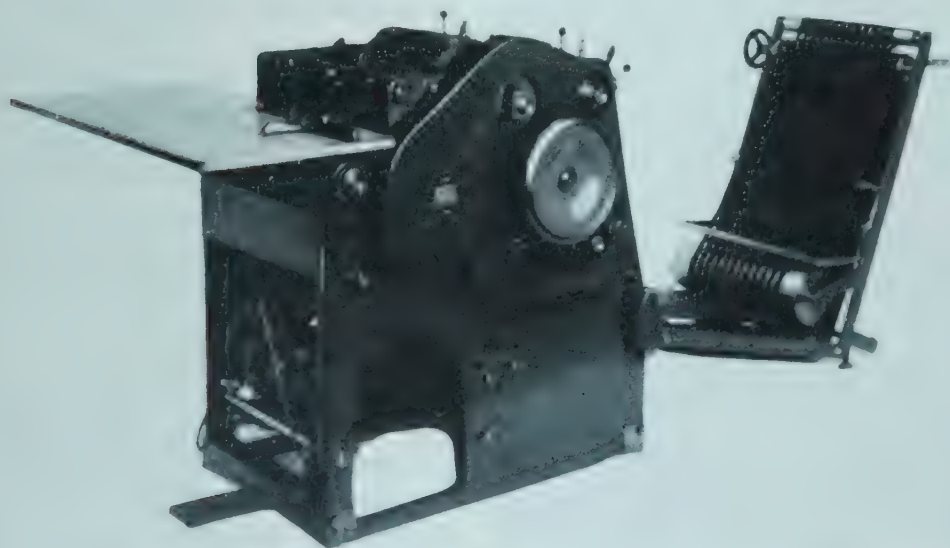
Two-colour Viking Model 5 label printing and seal embossing machine.



Sad-o-Matic reel fed machine for the production of labels, tags, tickets, etc. Model S.330 for web widths up to 13 in.



Two-colour Sad-o-Matic machine S.180 equipped for pressure sensitive and heat-fix label production. Web widths up to 7 in.



Two-colour hand-fed printing machine for printing ready-made bags.

such as the type and thickness of the product or package, and specified periods of freezing times are carefully drawn up by these specialists.

It is also claimed that this new method not only gives more effective freezing, but also a much more satisfactory maintenance of carton shape which is desirable from the standpoint of product presentation at the point of display or actual sale.

The unit consists of a well insulated chamber in which are housed the freezing plates. Full width super-freezer type flush fitting doors with heated gaskets are fitted at the front for loading, and removeable plug type inspection and maintenance doors are fitted at the back. Freezers with this arrangement of doors are referred to as Type 1 units. Where the purchaser wishes to incorporate the freezers in the air lock construction of his cold room they can be supplied with a second pair of full width doors at the back in lieu of the plug doors. This enables the product to be loaded into the freezer from the preparation area of the factory, and unloaded at the other side directly into the cold storage room. This method is recommended for its economy in handling and the extra cost of the additional pair of doors is small. Freezers with double doors at the front and back are referred to as Type 2 units.

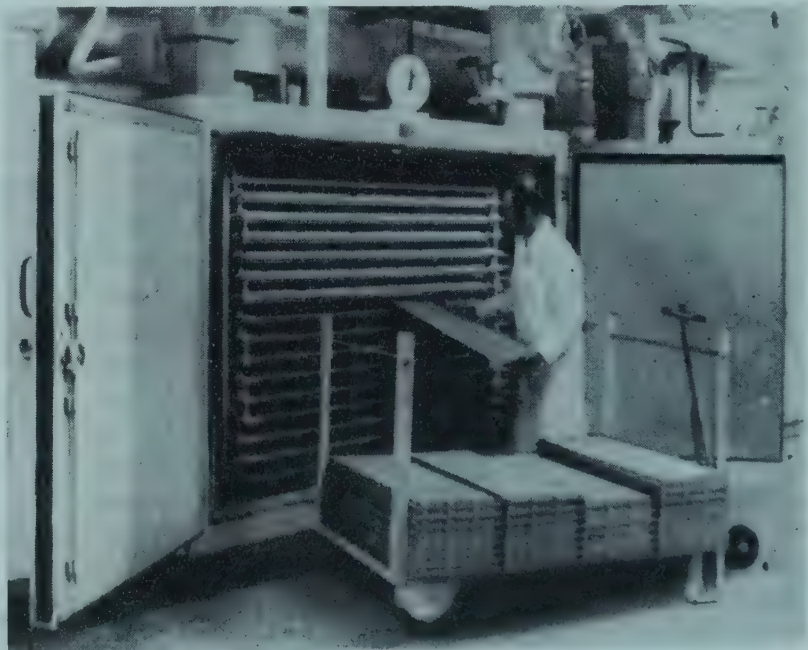
The movement of the plates is accomplished by means of hydraulic equipment mounted on top of the freezers and is controlled by one master lever. The plates are opened for loading and unloading, and closed for freezing, by operation of this lever. The pressure applied to the product in closing the plates can be controlled to give optimum contact for every product without danger of crushing. Once set the equipment automatically maintains the pressure throughout the freezing period.

The freezer will operate with ammonia, freon, or brine as the refrigerant but for the best overall results and operating economy ammonia refrigerant with positive pump circulation is recommended. This system besides being highly efficient lends itself very conveniently to hot gas defrosting which gives minimum loss of productive time for this operation. The refrigerant is fed to the freezing plates from inlet and outlet headers, by means of special flexible rubber hoses designed to operate at temperatures as low as -40°F . This is well below the recommended freezing temperature of -30°F .

The advantages of using this freezer in preference to the air blast type are:

1. Quicker freezing, especially with the new aluminium plates.
2. Lower operating costs due to the direct use of the refrigerating medium for freezing, (blast freezer first cools air which in turn freezes the product).
3. Smaller space required for a given output.
4. Very considerable saving in constructional work and capital cost.
5. Saving in installation time as the freezer is delivered ready for connection to refrigerating plant and immediate use.
6. Portable, enabling it to be moved to a new location if required.

This is not to decry blast freezing generally which has wide application for freezing irregularly shaped and awkward products such as whole chickens, beef quarters, whole cauliflowers, etc. For this type of product special blast freezers are available.



Above: The Williams double contact alloy plate freezer—capacity one ton 2 in. thick fish per hour.

Left: The Williams double contact alloy plate freezer—capacity 200 lb. 2 in. thick fish per hour. This is a packaged unit with own refrigeration plant and requires only connection of water and electricity.

Vacuum Filling Machine for Cartons.—Quite recently and for the first time in this country, the Hermic method of vacuum packaging has been demonstrated. This machine is the latest development in this form of packaging and claims to have a speed of 50 filled and vacuum sealed cartons per minute, the pack itself being not only light and economical, but one that can be stacked or packed for freight in rather less space. The Pearlite Box Co. Ltd., recommend this new method of vacuum filling of cartons.

As in all other Hermetet cartons, the outer board provides the protection against handling and freight, while the liner, an integral part of the carton construction, not only adds to the strength of the whole carton, but keeps the product in prime condition. The basic construction has only been modified by the introduction of lock ends and a liner, with all the product protective qualities required, but which also stands up to atmospheric pressure when the air is emptied from the carton. After negotiations with Esselte Fornpackning A.B., Pearlite are now satisfied with test results on a wide variety of liners for all types of commodities.

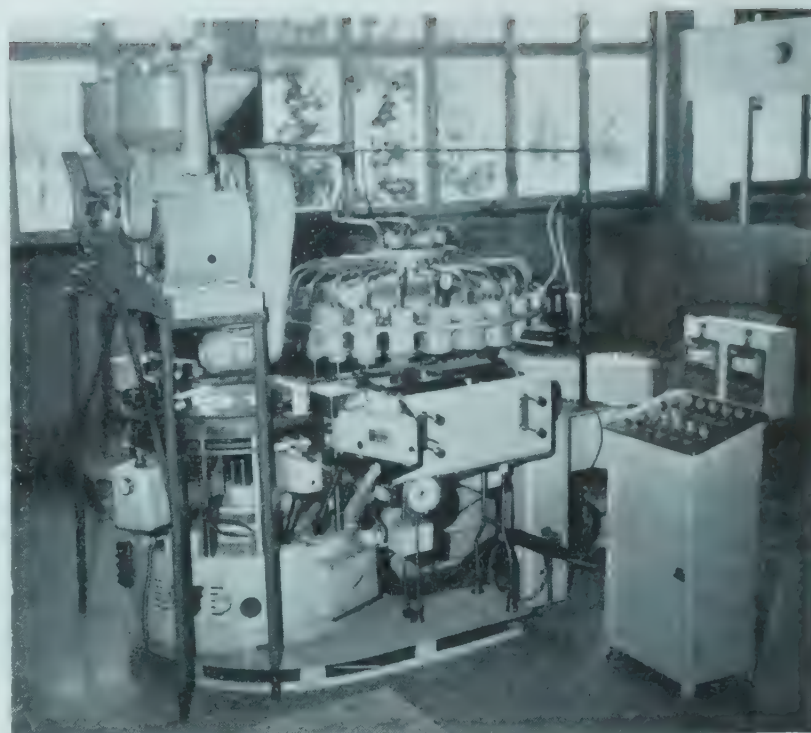
Similar in basic design to the Hermic 'X', the Hermic 'XF' is a fully automatic packaging machine from the automatic feed magazine to the final closing and sealing. The power loading is approximately 10 kW including vacuum drive and the area occupied as little as 10 ft. x 9 ft. The cartons, fed in flat from a 500-capacity magazine, recharged without interrupting production flow, have the base folded and the polythene paper liner closed and heat sealed. The base lock end is then closed, carton filled, vibrated and coded under controlled conditions, the carton top folded and the liner top folded but not finally heat sealed. The carton now passes to the vacuum unit where the air is replaced by inert gas, normally carbon dioxide or nitrogen, supplied from high pressure bottles of standard industrial size, and this gas, in turn, is exhausted, resulting in a very low residual oxygen content inside the pack. On leaving the vacuum unit the top liner extension is finally heat sealed and the carton top closed and locked. The carton is now ready for despatch.

The exhausting process is by the standard gas 'flushing' method replacing the air in the carton by inert gas under controlled vacuum and pressure conditions. The exhausting takes place in a 24-head rotary unit in which the cartons are individually totally enclosed by an outer metal cylinder, thus ensuring uniformity and that the carton is not subject to external pressure during the various stages of the operation.

The whole packaging cycle is controlled from a single motor control box operated by the individual feeding the machine, and, visible on the control panel, the heat sealed temperatures are under permanent observation by the operator feeding the machine. All safety devices are incorporated and, particularly, to ensure that no failure of the heat sealed joints shall occur. However, owing to extraneous faults in the vacuum sealing, should any such failure occur, an alarm is immediately activated.

Only two girl operators are required to tend the machine with the occasional attention of a mechanic. Gas bottles can be replaced without interrupting the packaging cycle.

This current news from Pearlite must bring to mind the widest variety of commodities that necessarily require



Vacuum filling machine for cartons.

vacuum packing. Ground coffee is the prime example, but producers of those oxygen-absorbing pulverents such as fatty cake-mixes or dried milk will certainly have their attention drawn to the Hermic 'XF'.

The first two Hermic 'XF' machines are installed in Sweden and Germany; the latter installation for the packing of vacuum sealed ground coffee. The technical know-how and valuable experience of these installations is readily available.

It is Pearlite's claim to protect the packaged goods from the time they are packed until they are put on the shelf in the shopper's home. Now they can claim to lighten the shoppers' load with a pack which is lighter in weight than any other vacuum-filled pack now produced in this country.

Check-Weigher Machines.—There are a number of check weighing machines used in the food industry made by such well-known firms as Avery Ltd., Autopack Ltd., Southall & Smith Ltd., and Industrial Products (Speco) Ltd. Such machines are used extensively in the food industry in connection with automatic packaging equipment dealing with such food products as cereals, tea, sugar, flour, various powder and granulated materials of all kinds. Various types of machines have been formulated to handle weights within certain limits relative to the packages involved. Where larger packages are handled, such as may be specified by weight for the export markets, larger machines are available. Machines vary in weighing number per minute and to an accuracy determined by the packager, in conjunction with regulations and formulae produced by the machine specialist. In some instances, weight is indicated by dials, indicators or lights which, in conjunction with some form of chart, show up light or heavy weight packs.

The various types of machines may be worked on a bench or, in some cases, they may be planned to fit in with the production line. Vegetables are also weighed on new types

of machines which are capable of weighing 14 to 16 units per minute. Both bag feeders and weighing machines may be supplied as a combined unit.

Illustrated is the Hy-Tra-Lec 'Steamline' Model 2 check weigher made for the purpose of handling wide packs. Saltines in their packages may be seen in process of examination. This machine is made by Industrial Products (Speco) Ltd.

ACMA 762 Portion Packaging Machines.—Soag Machinery Co. of London manufacture and market many first class types of packaging, bag opening, filling, closing, portion packaging, carton wrapping, labelling, and other machinery used by the food and beverage packager. Illustrated is a double output version of a portion packaging machine of special interest to the food industry. It is a development of their former machines such as Models 762.

The Acma Models 762 portion packaging machines operate from a single reel of heat sealing material. In operation the reel is formed into a V and a heatseal is applied vertically by means of heat sealing bars. The bag thus formed is severed from the web by knives working with a scissor action and the cut off bag held by suction while it is introduced into timed grippers on a horizontal revolving turret. The filling of free flowing powders and granular products can be carried out volumetrically by one or two dosers. If two different products are to be filled the machine can be provided with one volumetric and one auger feed and although two volumetric fillers can be utilized it is not possible to fit two auger feeders to the machine. After filling the bags are closed by means of heat sealing and released from the grippers into the delivery unit.

The machine can operate on a material which is pre-printed by sections requiring accurate automatic registration by means of an electric eye registration unit. A perforation device located between a vertical heat sealing strip will sub-divide a large bag into two separate compartments each of which can be filled with different products. This subdivision is made before the bag is severed from the web. Using change parts the machine can form bags in width

varying from $2\frac{1}{8}$ to $5\frac{1}{2}$ in. and in length of up to $5\frac{1}{2}$ in. The machine can operate at speeds of up to 4,000 filled bags per hour using a $\frac{3}{4}$ h.p. electric motor. The machine is very neatly and compactly designed occupying a floor space of approximately 5 ft. 2 in. x 3 ft. 6 in. and weighing 16 cwt.

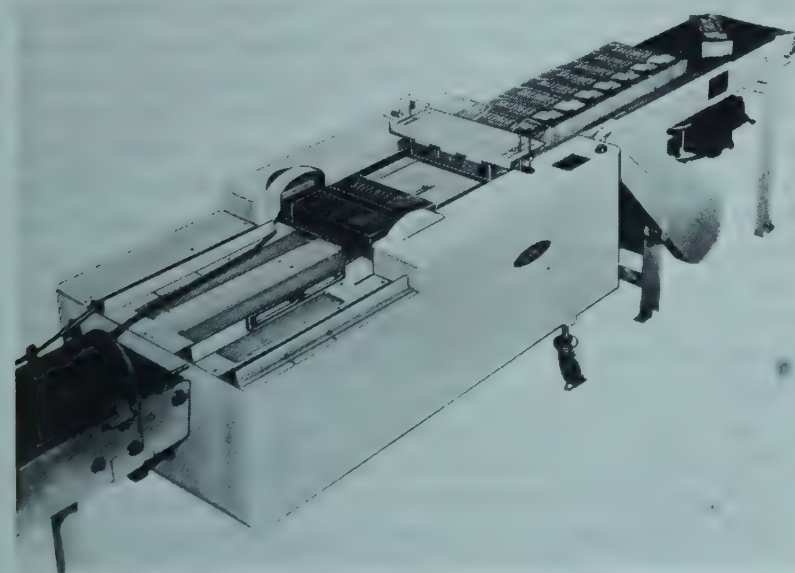
The Model 762/3 is a double output version of the same machine working on similar principles but cutting off two bags at a time and filling them both simultaneously. This machine can reach a maximum output speed of up to 8,000 packages per hour with bag width varying from $1\frac{1}{8}$ to $2\frac{3}{8}$ in. and length of up to 5 in.

A further variation of this machine is the 762/4. The operation of this machine is basically similar to that of the other two models. However, in order to obtain very high output speeds there are some modifications in that first of all two bags are severed from the web and given a primary filling. Next a heat sealing device seals the bags horizontally across the middle and at a subsequent station a further two funnels fill the upper portions of the bags. These are then sealed and a cross-cut device can separate the two bags. In this way an output speed of approximately 260 a minute can be obtained.

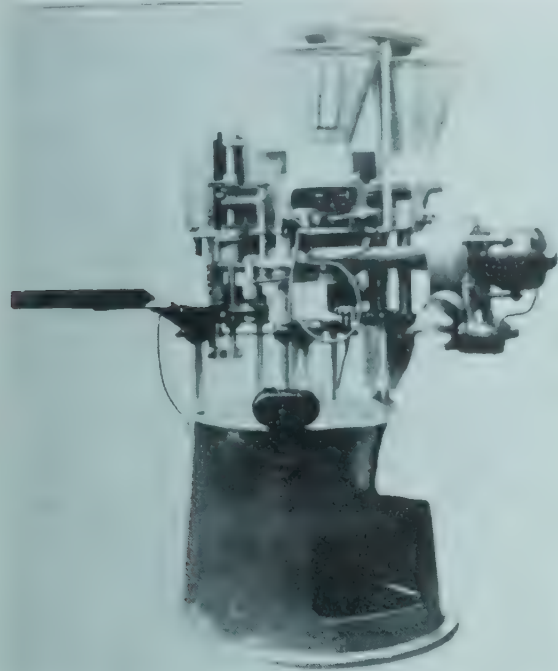
ACMA 733 Opening, Filling and Closing Machines.—Soag Machinery Co. now market new machinery for the purpose of filling powders, grains, crystals and similar food products into bags and the series of machines under reference 733/1-2-3 and 4 are ideally suitable for this important packaging operation. These machines handle the bags from the magazine, dose and insert the product and enclose or seal the mouth of the bag with adhesive or seals in the case of heatsealing label or paper. Two of the machines are shown,



Soag portion packaging machine.



The Hy-Tra-Lec Streamline Model 2 check weigher.



The ACMA 733/1 filling machine for powders, grains, crystals, etc. into bags.

one being used for dosing and filling any powder products and granular items of small size such as cocoa, flour, rice, coffee, small macaroni, into block bottom shaped bags or other containers with similar folds on the bellow principle, with successive sealing by means of metallic clips.

The Acma 733/1 machines operate using pre-made bags which are taken from the stack. The individual bags are withdrawn from the stack by a spade which is provided with air blast nozzles at its apex. This spade enters the bag, which is withdrawn, opened and introduced into grippers on a horizontally revolving turret ready for filling. The machine



The ACMA 733/4 filling machine handles flat bottom gusseted bags.

measures the quantity of filling product either volumetrically or by means of auger feeders. In the event of two different commodities being required to be filled into a single bag filling can be made either by two volumetric fillers or by one volumetric filler and one auger feed. After filling the bags can be sealed by means of heat or by glue. This type of machine will handle filling capacities from 1 to 160 cc. in bag sizes varying from $1\frac{1}{8} \times 2\frac{1}{8}$ in. to $3\frac{3}{4} \times 6$ in. The machine utilizes a $\frac{1}{2}$ h.p. electric motor and can operate at speeds of up to 3,900 filled bags per hour. The machine is very neatly designed and occupies a circular floor space approximately 3 ft. diameter.

From this basic machine various models have been evolved and different machines can be made available for various operations. One machine has been designed to provide a double container pack which is a bag provided with a seal and perforation down the centre giving two separate packets, the overall bag sizes being $1\frac{5}{8} \times 2\frac{5}{8}$ in. to $3\frac{1}{8} \times 4\frac{3}{4}$ in. Using this type of bag different commodities can be filled into each pocket, the maximum output speed remaining the same as for the standard model. It is possible to couple together two machines on a common base so that once a bag is filled and sealed on one machine it can be passed on to a second machine and placed into a larger bag which is sealed providing a double pack. From this basic idea equipment has been developed in which three machines can be coupled together on a common base. Using this combination one bag can be filled and sealed on each of two machines, and then the two filled bags introduced into a larger bag which is then sealed on the third machine.

A larger capacity machine, the 733/2, is available for filling quantities of up to 600 cc. into bag sizes up to $5\frac{1}{2} \times 9$ in. at speeds of up to 3,600 bags per hour. Depending on the actual operation being performed this machine will require a motor of from $\frac{1}{2}$ h.p. to 1 h.p., the floor space required by this machine being approximately 4 x 5 ft. Another variation is the 733/3, a double output machine which can be used when smaller filling quantities are required. The unit is supplied to fill quantities of up to 65 cc. into bags from $1\frac{1}{2} \times 2\frac{5}{8}$ in. to $2\frac{5}{8} \times 5\frac{1}{8}$ in. Speeds of up to 8,000 per hour are obtainable on this machine using a $\frac{3}{4}$ h.p. motor.

The 733/4 machine is designed to handle flat bottom gusseted bags and in addition to the normal glue sealing or heat sealing, the machine can apply one or two metal eyelets. These machines are ideally suited for the handling of powdered and granular products such as flour, rice or coffee, etc., in quantities of up to 600 cc. using bags within the same size range as the 733/2 machine. Output speeds of up to 3,600 per hour are obtainable using a $\frac{3}{4}$ or 1 h.p. electric motor.

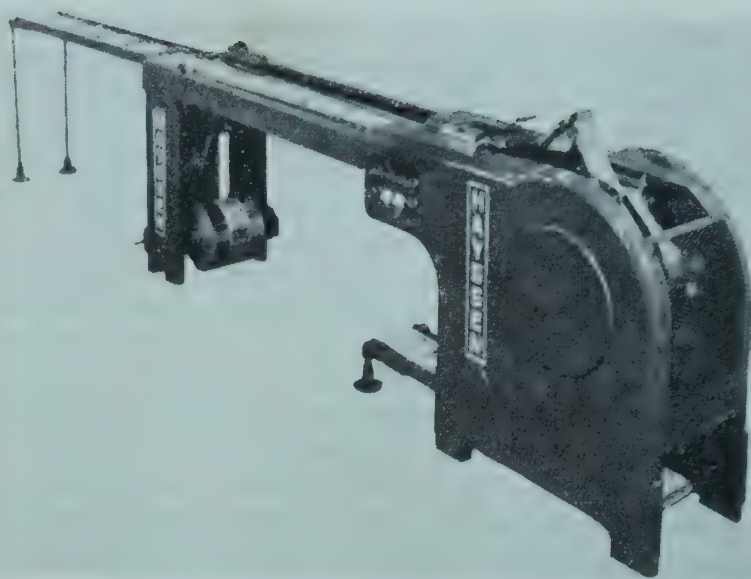
All of the machines in the 733 range can be provided with dust suction devices to establish date or packing batch number.

The Hayssen Carton Automatic Wrapping Machine.—A new American wrapping machine based upon an entirely new principle which permits of much higher production rates than usual for this type of machine, and at the same time offering the advantage that adaption to different sizes of

packages can be obtained in an unusually short period. The machine is self-adjusting and has a continuous flow operation. It is capable of wrapping almost every kind of product including cakes, pies, cookies, rolls, crisps, popcorns, peanuts, dried fruits, cheese, ice cream, coffee, tea, fresh fruits and vegetables, frozen foods of all kinds, fish products, sausages, and so forth wrapping them in almost any material in the cellulose class, foils, wax papers or heatseal papers. The wrapping principle is to enwrap the unit or item tubularly subsequently transversely sealing the web to form a neat unit package.

The style of package, produced by this machine, is (up to a certain point) comparable with that of the Campbell wrapper of Hudson Sharp and later adopted by Forgrove, Rose Bros. and S.I.G. (Switzerland) in so far that a web of packaging material, taken from a reel, is formed into a tube into which the product is inserted and thereafter sealed-in. Usually in this system the web is shaped into a tube by the aid of a metal former having an opening through which the article is introduced into the package. In this new Hayssen machine, however, the web is folded round the product by means of guides and then the lengthwise seal is made. The *product itself* determines the size of the tubular web. This means that for change-over to another type of product there is no need to substitute a former and all that is required is to adjust the height of the heatsealing device for the lengthwise seam. This may be an improvement on existing systems; quite as revolutionary is the way the transverse sealing and cutting is performed. The machine is provided with a drum of fairly large diameter, which is fitted with concentric guides within which move a set of heatsealing devices which can be magnetically locked to the drum. This drum rotates at a constant speed and so long as no product comes into the section to interrupt the beam entering the photo-electric cell, the heatsealing devices remain unlocked. However, when a product already wrapped in film passes through the light beam, the photo-cell generates an impulse which activates a solenoid locking the foremost heatsealing device and allowing it to travel around with the drum. Each heatsealing station has a fixed bar and an upper bar provided at one end with a pivot. The opposite end however, has a guide roller held in a track which is curved in two planes in such a way that the upper bar which is in the open position when the charged film tube passes over the lower bar, clamps down on top of it, performing the sealing operation and also separating the formed package from the tube. Then the upper bar returns to its open position, the heatsealing device is unlocked and stops moving and since, in the meantime a second package has passed the light beam, the following heatsealing device enters the locked position and repeats the sequence of operations.

From this short description, two things become clear: in the first place, the machine itself determines the length of the package by means of the photo-electric equipment; and in the second place, to prevent waste of wrapping material, the products, no matter what their individual length, must be fed into the machine spaced at uniform and economical distances apart. To make this possible in an easy and practical way, the infeed end of the machine is provided with



The Hayssen carton automatic wrapping machine.

a transport band, driven at an adjustable speed. This band which always runs faster than the conveyor system in the machine itself delivers the products into this second band in a uniform sequence, interspaced according to the different speeds of the two bands. Merely by turning a handwheel, this can be regulated as required. For changing over from one type of product to another with different dimensions, all the operator has to do is (a) to adjust the speed of the infeed conveyor belt; (b) to adjust the height of the heatsealing device making the lengthwise seam; (c) to replace the reel of wrapping material in relation to the width of the article.

The production rate of the machine is between 20 and 150 packages per minute, dependent on the type of wrapping material and the length of the package. The machine can handle all heatsealable types of material, including polythene film. A clue for an average output is the speed of the web, which can vary between 50 and 70 ft./min., depending on the dwell-time necessary for making adequate seals.

Automatic Capping Machines.—There are a wide range of capping machines among which is the 'Novacap' by Soag. Such machinery is both simple to operate and low in cost, serving the purpose of providing an aluminium closure for the container. This machine is best described as an automatic highspeed unit and is so designed to be incorporated in an entirely automatic layout, comprising for example: washing, filling, corking, capping, labelling, etc.

The bottles are fed in upright position and proceed through the machine in that position on a flexible stainless steel conveyor. The standard machine employs collecting and receiving tables at entry and outlet. However, the conveyor can be adjusted to suit the users' requirements. The bottles are assembled and fed automatically into a slotted wheel which revolves intermittently. On their way to the capping position they are provided with caps which are fed down from a vibrating hopper which sorts and forwards them automatically.

The automatic cap distributor is not an essential accessory as in cases where output is fairly low, caps can be placed on

the bottles by hand. However, high production speeds which tend to reduce labour costs, make the automatic capping unit not merely desirable but very often indispensable. After the cap has been applied, the bottle is moved to the capping position where it is raised and placed in contact with the capping head. Capping is effected by centrifugal force with the assistance of rollers turning at high speed. The rotation of the head is actuated by a separate motor mounted in the overhead casing. Once the capsule has been sealed on to the neck of the bottle, it is deposited on to the moving conveyor and delivered out from the machine.

The automatic capping machine type Novacap has small dimensions and takes up less than one-third of a square metre floor space. The electrical installation includes an automatic stopping device which will be actuated when any unusual occurrence, such as a bottle coming into the machine on its side, or any article which might become jammed, takes place. Furthermore, the capping unit is totally enclosed in thick moulded Plexiglas casing, which affords complete protection even in the eventuality of a bottle accidentally breaking. Operation of the machine is completely simplified by having all controls mounted on one central panel.

The machine comprises two main sections, as follows:

Main frame: This includes the moving conveyor band and also the bottle forwarding unit. All mechanical parts are contained in a water-tight compartment located beneath the chassis table. This enables the moving parts to be kept immersed in an oil bath, thus eliminating the need for any maintenance apart from an occasional oil change.

Capping head: This is mounted on a vertical slide to enable it to be raised to the height of the bottle to be capped. It comprises a bracket which supports the sealing spindle as well as the actuating motor.

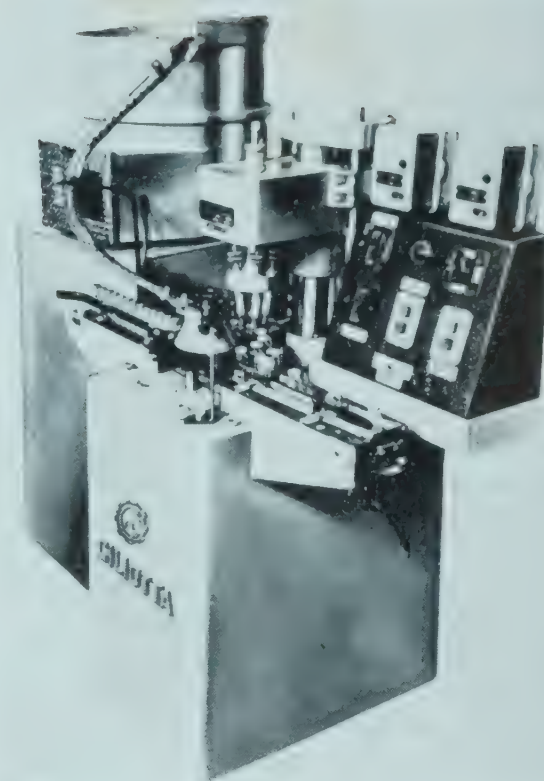
Production and capacity are as follows:

1. Bottles: Maximum diameter—70 mm. The size adjustment can be made in a few moments.
2. Caps: The type of cap used is important and production varies accordingly. Penicillin type caps—approximately 6,500 closures per hour. Screw type Caps—approximately 4,000 closures per hour.

Naturally, the optimum speeds mentioned above can be reduced, as required.

If the caps are automatically fed (as is usually the case), it is essential that the same type of cap be used for different types of bottles, and therefore the necks of the bottles should be standardized. If this is not possible, it would be necessary to use a different automatic feeder for each type, or to place the caps on by hand, where smaller production is involved.

Automatic Labelling Machines.—Considerable progress has been made in recent years in the manufacture of all types of labelling machinery dealing with both packets and bottles and in particular, the food and beverage industries have been kept well in the mind of the machinery designer and manufacturer. Among recent additions to the field of food and beverage packaging is the 'Vita 78' type machine marketed by Soag Machinery Co. It has been produced as



Ciliotta Novacap fully automatic capping machine with automatic cap dispenser.

a result of the desire to increase production in various sections of packaging, without necessarily increasing manpower. This is the first model in the series.

This machine is envisaged to form part of a complete production plant which, for example, could comprise machines for filling, sealing, labelling and packaging. The machine receives the bottles standing upright, i.e. in the same way as they have passed through previous machines in the line.

With regard to the feeding conveyor for the bottles, this could be the chain of a complete group of machines, or, for example, that of the bottle closing machine, so that difficulties in the transference of the bottles from one machine to another, are eliminated. Irrespective of the method employed in the production plant, bottles either arriving in rows or singly, are fed into the machine without being touched by hand. If a bottle is missing, no label is fed and the machine merely goes through the mechanical motions without harming the mechanism. Both the label magazine and glue tank can be replenished while the labeller is running, and therefore there is no question of stoppage of the complete packaging line. Suitable electrical devices guard the machine against any mishaps arising from fallen bottles, from bottles blocking the flow or from bottles which are too thick. The machine will stop immediately by the use of a brake motor which also simplifies the attendance on the machine.

Should certain work demand that bottles are not labelled, there would be no need to bring the complete plant to a stop, as the conveyor belt can be engaged independently from the labelling mechanism and the bottles can pass through without difficulty.

The speed of the labelling machine can be adjusted by

means of a speed control provided to suit the speed of the other machines comprising the line. It is claimed that labelling speeds of between 2,000 to 4,000 per hour, according to the size of bottle, are obtainable.

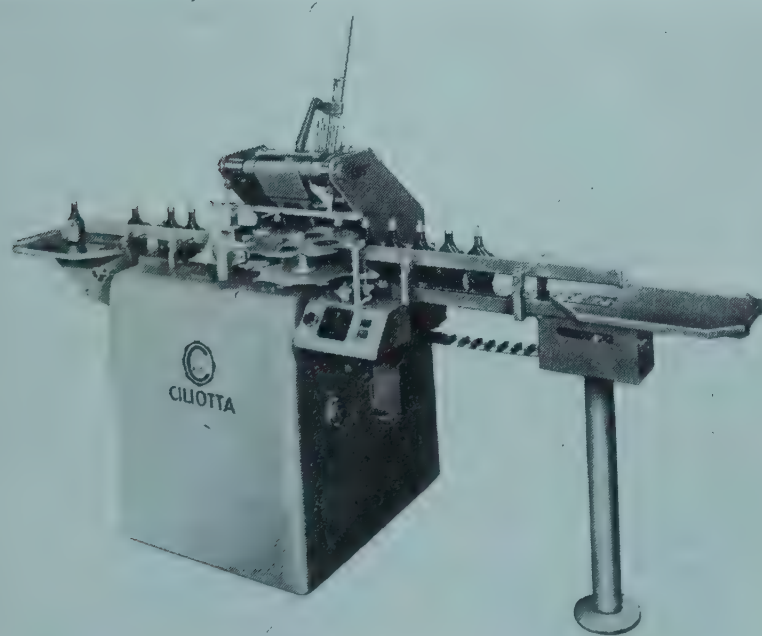
To ensure continuous running of the unit, and to eliminate production losses of any kind, special care and thought has been exercised in the construction of the machine. Ball bearings, roller and needle bearings have been widely used, and a centrally controlled complete lubricating system reduces daily maintenance to the minimum—a simple operation of the pump lever ensures that the machine is oiled for the day. In addition, self-lubricating bearings have been provided for certain movable parts, which would otherwise be difficult to lubricate.

Special guarding devices are furnished to protect the machine against glue deposits and soaking by liquids from broken bottles.

The machine is fitted with amply dimensioned speedily lubricated and extensively guarded equipment, ensuring satisfactory and trouble-free operation for years.

All bottles, boxes and other objects are fed to the machine in an upright position, provided they possess a certain degree of balance, and their maximum dimensions correspond to a standard one litre bottle or a normal one litre milk bottle. The label can be applied either flat or over half the circumference of a cylindrical or tapered object, or even over three sides of rectangular objects. A special device permits overall pasting of labels, but in this case the machine would be restricted to this application only, i.e. pasting over the whole surface of the object. With the standard design of the machine as earlier described, it is possible to change the machine from one size to another by interchanging the requisite ancillary parts. A slightly different device enables labelling to be carried out with hot glue.

Batch Wrapping.—The batch-wrapping of containers such



The Ciliotta Vita 78 type automatic labelling machine.

as jars, cans and earthenware units, is now a mechanized operation as a result of a new machine designed to wrap small groups of products and packages in heatsealable materials. This machine, originally developed by C. S. du Mont of Woking, Surrey, is made to apply a cellulose film wrapper round a half a dozen jam jars in a single cycle of operations. It is also used to wrap together, cartons, boxes, packages and similar units. It is claimed that ten batches per minute is within the scope of the operator but this can be increased with experience and some skill. Some four or five minutes are required to adjust the machine to handle different sizes and the batches may be from 5 to 13 in. in length by 3 to 4½ in. in height. In addition to heatsealable cellulose film, the machine will handle waxed coated papers and laminated heatseal paper fed from the continuous reel with a maximum diameter of 10 in. The length of the wrapper cut off may be varied while the machine is in operation.

Machine for Wrapping Cheese in Slabs and Wedges.—The new U51F Alpma cheese-wrapping machine has been designed to handle slabs or wedges of cheese, the finished packaged product being wrapped in a tight skin of filmic material at the high rate of some 2,500 pieces per hour. The retail packaging of all kinds of cheese is now very popular, both from the standpoint of self-service and the retail distribution trade in general. There is continual research going on in order to determine the best method of prolonging the shelf life of cheeses in order that their flavour and quality may be maintained in the best way. All scientists will agree that a first class tight wrap which prevents the formation of air pockets tends to improve the quality of cheese put up in retail portions. Many packagers have popularized the system of vacuum packaging in a virtually gas-tight film and on the continent, many packagers are seriously concerned with the more recent shrink type film which generally assists in production methods. The new automatic machine is capable of packaging 2,500 pieces of cheese per hour as opposed to existing methods of packaging by hand, using a hot plate for the purpose of heatsealing packages. This machine is designed for handling plain, embossed or paper back foil, filmic wrapping of vegetable parchment. The machine is equipped with a special attachment where Cry-O-Vac film as a wrapping medium is used and in this way, the wrapping and shrinking operation takes place in one sequence. The cheese portions, be they rectangular or wedge in style, are carried as a result of the pocketed conveyor into the wrapping position, at which stage, they are projected by the action of a plunger into a portion of the wrapping material, which is presented at an angle of 45 degrees to the horizontal. The plunger moves obliquely, pressing the cheese portion down into the web and carrying it through the framelike opening which is designed to support the edges of the cheese. As a result of forcing the cheese downwards, the edges of the wrapping are thus drawn tightly round the sides of the cheese forming a tray which contains it. From thence, the wrapping action is completed by the movement of four sliding members which move in over the upper surface of the cheese carrying with them the edges of the wrapping. Operation is said to be

identical whether the cheese portions be rectangular or wedge shape, but the degree of pleating around the sides and over the base of the package will vary according to the shape of the portion, while both provide an extremely neat wrap which may be enclosed by the application of a thermoplastic label applied by heat over the base of the package, this part of the pack permitting an inspection of the goods at the point of sale. For different shapes, this machine should be fitted with varying change parts. Three different sizes of cheese portions may be wrapped on one machine without difficulty. Wedge, semicircular, rectangular, round and other shapes may now be wrapped on this new cheese packaging machine.

Paper Shredding Machinery.—All kinds of waste paper and board may be shredded down and used for protective packing in conjunction with other materials such as pads, wads, cushions or sections in packing cases. This treatment obviates the use of wood wool, sawdust or straw. The machines are easy to handle and most are operated quite simply by operators after a short time. Tingey & Co., manufacture various light, medium and heavy duty models for this purpose capable of dealing with sheets, scraps, reels of material at the rate of one to two tons per day. Larger machines will deal with twice this volume of waste.

Packeting Machinery.—Various types of fast running automatic packeting machines are available to the packager for the purpose of enclosing all kinds of powders and granulated food items in paper satchels, bags, wallets, cartons and in various types of laminated foil wrapping. The Job Day & Sons organization manufacture various machines for all of these purposes where free flowing materials are being handled. Such machinery may be used in conjunction with weighing, measuring and other forms of packaging equipment.

Other types of heatsealing, enclosing and sealing machines are dealt with in Chapter 10.

The Future of Sterilized Food

The prospect of meat, vegetables and other foods preserved from decay—sterilized by a process of ionizing radiation might possibly be in sight. Work carried out over the past 20 years has led to the present position where it could conceivably be adopted sometime in the future for large scale food production. Just as the new Dounreay nuclear reactor was compared to Calder Hall and likened to a rocket motor compared with an old fashioned diesel, so sterilizing food products by radiation might be compared to our present methods of food preservation.

Radiation.—The types of radiation which can be applied to foods at the moment are the high energy cathode rays or soft x-rays from suitable generators, or penetrating gamma rays from radioactive materials, all of which have characteristics which will cause ionization of a molecule by the ejection of an electron.

Application.—Radiation sterilization might be applied to raw or lightly cooked foods—meats and vegetables—without rise in temperature and with little chemical change in a continuous production process with the products in their final packs or containers. With many other products, such as horticultural plants, tobacco, wood, textiles where insects are a disadvantage these can be rendered inactive quite efficiently. Pharmaceutical products lend themselves to sterilization with less complications and this field will probably give the operating experience necessary before embarking on large scale food processing.

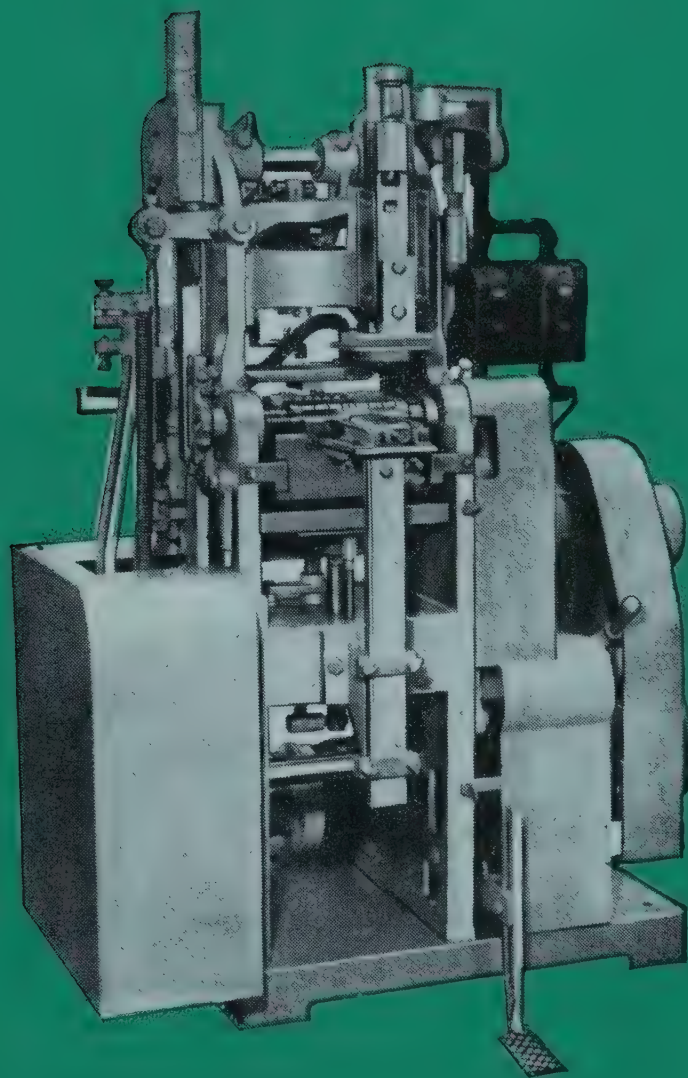
Operation.—The increase in operating nuclear reactors will make waste radiation available for sterilization and the penetration of gamma radiation from these sources should be adequate for deep treatment of thick food samples. Irradiation would be effected by merely passing the food through a given distance in a given time.

Packing.—The loss by absorption of a fraction of the radiation by the package or container can be reduced by avoiding heavy containers and by designing packs or cans to take advantage of the penetration depth. Cans of thin gauge metal, preferably of aluminium or other light metal, would be much preferred with soft x-rays which are absorbed to a disproportionate extent by heavy metals. There are no processing stresses comparable with those involved in heat sterilization and the can need only be strong enough to withstand damage during distribution, and in many cases might well be made of thinner metal than is now conventional.

Flexible packaging with aluminium foil and film will require highly efficient sealing to offer protection against moisture and oxygen penetration to the sterilized foodstuff. The film/foil combination would probably be most successful in contributing to the production economies particularly where processes involve deep freezing before irradiation.

Being able to stock up with three month's supplies will not stop the daily or weekly shopping trip. This seems to be more of a social custom providing a necessary human contact and an opportunity to 'have a word' with friends, acquaintances and even strangers, rather than an efficient method of obtaining domestic supplies.

Labelling



The
Pony Labelrite
Labelling Machine

A very wide range of containers and products can be handled with this versatile machine

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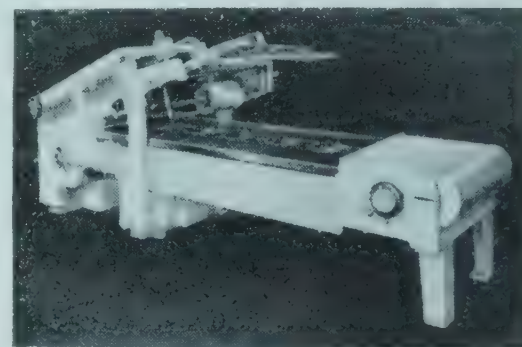
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The Forgrove Machinery Co. Ltd., a member of the Baker Perkins Group of Companies, brings a special kind of experience to packaging problems. In many cases—such is the scope of the Group—Baker Perkins also make the machinery that makes the product that goes *inside* the pack; machinery for making chocolate, confectionery, bread, cakes, biscuits, chemicals and plastics.

In fact, from the standard range of Forgrove machines produced in the three factories of the Group specialising in packaging equipment, there are many units which could fulfill your company's needs for efficient economical packaging.



The Forgrove Machinery Co. Ltd.

Head Offices: Westwood Works, Peterborough

BP/W.13



CHAPTER 3

Labelling, Closure, Branding and Coding by All Methods

MOST products have to be labelled or branded with a label which usually carries a trade mark, a brand name, message or instructions relative to application of product usage. Articles, merchandise, packing cases, containers, filmic wrapped packages also carry a label which often not only serves the function of a brand identification, but also forms a closure for the seams, ends, flaps or edges of the material used for packaging. The label, whatever the basic material or adhesive recipe, is an essential part of the process of packaging, the final seal which 'hall marks' or labels the product. Labelling is now considered as part of the process of manufacture. The label serves the dual role of sealing or branding the product and assisting in the sales and display of the goods while they are exhibited in the shop window or store. The label's function has been increased and now goes far beyond its former conception of usefulness, that of identifying the goods; it now has to sell the product by helping to stimulate consumer choice. The label has a new importance where product purchase is often solely in the hand of consumer choice. Goods sold in the supermarket are purchased without the aid of a retailer. The first impact of the product helps to decide the purchase and this is where the label appeal makes the difference in consumer choice.

Colour, shape, style and suitability to product are some of the new aspects of the modern label. The chapter on the subject of label designing offers some ideas for serious consideration among label users. The label should be taken seriously both from the standpoint of adhesive suitability and paper choice. There are many label printer specialists who are able to produce every type of seal, cameo, and brand label. In this chapter, we are concerned with product packaging labels and not labels designed for labelling bulk merchandise and packing cases. The packaging label may be either permanent or temporary. In the case of the permanent type, this may take the form of a cellulose transfer label, a heatfix label, or a gummed label of some suitable type, which is employed to serve the purpose of a permanent brand mark for the product. Temporary labelling may best be described as a process of product identifying, coding, and pricing merely up to the point of sale when the label is often removed by peeling, as is the case with self-adhesive or pressure-sensitive labels.

There are many new types of gummed labels based upon the use of various basic papers such as metal lined, bronze coated foils, fancy label papers, white and coloured clay coated label papers such as tinted enamels, surfaces, chromos, friction glazed, imitation gelatine, flints and similar coloured coated papers, and other types of papers which

assist in the printing of an outstanding and individual label. There are also the established forms of label papers and, in this field, there is an endless range of white papers and coloured pulp tinted papers which afford the label users a very wide choice of style. The adhesive recipes vary considerably and there is a gummed label paper available suitably coated to adhere to any pre-chosen surface. As is the case with most commodities, considerable progress has been made in recent years in label paper varieties and in particular in the manufacture and application of gummed paper. Gone are the days when it was made in sheet form, so curly that it was difficult to print, use or store. The introduction of the noncurling process saw the end of that period and the constantly increasing volume of label business produced on gummed label papers of every kind renders tribute to its utility, efficiency and popularity among label users and packagers in particular. The process of manufacture has been perfected beyond measure and gummed label papers are available which adhere firmly and for all time, or as long as may be required, to such surfaces as glass, tin, plain or lacquered tinfoil, varnished or printed surfaces metals, iron, steel, leather, fibre cloth, cloths, woollens, ebonite, and many other surfaces now used in modern packaging. There are gummed label papers which when applied to containers withstand all the conditions encountered in the processes of canning, cold storage, and deep freeze and at the same time fulfil the requirements of exported products to any climate.

Printed labels produced on gummed paper stay flat and store indefinitely under normal conditions and the printer now finds that he can treat such papers with the same ease as ordinary printed ungummed stock. Many label printers package their printed labels in an inner protective wrapping of waxed paper and this further helps to preserve the adhesive properties of the label. Labels should therefore be kept in store wrapped as they are received until they are actually needed for a packaging operation.

Labels may also be supplied in units, in perforated sheets, on the reel for automatic feeding into packaging and labelling machinery, the surface being gummed all over or in position, i.e. strip gum as required for edge or partial adhesion to a surface or package, as an over-wrap.

The study of labelling methods in industry and their application to products and surfaces have long been a matter of consideration and the specialists claim that while gummed labels cost more than plain labels with liquid adhesive, they are cleaner in usage, quicker in application and in view of labour costs and their constant upwards

trends, they are in fact much cheaper where continuous packaging projects are involved.

Hand operated labelling machines and those which mechanically moisten and dispense labels ready for application are available. The importance of efficient label moistening cannot be too strongly emphasized. Gummed labels should be evenly moistened all over by some kind of machine. Too much moisture may wash away part of the adhesive coating while too little will hardly activate the gum. This can account for inefficient labelling and labels that come adrift from packages in store and transit. The scientific application of moisture to adhesive surfaces has been a constant study with the specialist for some years.

In cold weather, labelling machines may be filled with some warm water as this readily dissolves out the adhesive coating which may become hardened.

White and Coloured Gummed Label Papers

White gummed papers used for labels vary considerably in quality, price and label surface. There are wood-free varieties, i.e. paper free from mechanical wood fibre, and those based on Esparto grass fibre furnish. There are also various substances or thicknesses and all these have been produced with a purpose and for a printing process. Most of these grades will enable the printer to produce first class colour labels by letterpress or lithographic process of printing in one, two or more colours. Hard sized label papers, i.e. papers which carry a good degree of sizing in their furnish or make up, may be varnished after printing thus rendering the label waterproof and dustproof.

In this field of label papers there are various gummed coatings. Dextrine gumming will answer many purposes in label application but often double, treble and heavier coatings of gum are required for adhesion to difficult surfaces. Dextrine gummed labels are for everyday labelling projects while tasteless and pure gum arabic coatings are used for labels where purity and freedom from odour or taste are important as is the case with some types of food labels. Treble gummed labels are for strong adhesion and a series of powerful adhesive coatings may be used in the case of extremely difficult surface labelling. Advice as to the best label paper for the job may be sought either from the gummed label paper maker or the label printer specialist. Tests may always be made under field conditions to ensure that the correct adhesive recipe is used for the labelling or sealing operation.

Colour is always important and colour may be said to sell the product more than ever before, and the continued use of a colour helps to establish a brand name. It is well to remember that a two-colour printing carried out in a label on a coloured paper gives the effect of a three colour printed label, while saving the cost of the third colour. Coloured label papers are available in almost every tint, tone or hue and there is a colour to harmonize with every packaging scheme. For long runs of label work, special colours may be produced specially for one packager so that his product may become known by its coloured label. The Kodak yellow, the Ricketts blue, and nationally packaged cigarettes in

colour schemes are merely some examples of colour application in labelling projects. Ordinary tinted pulp papers gummed may be printed by all the modern processes of printing.

Where ink and colour solids in printing are required, there is nothing to equal the clay coated enamel or surface label paper, made in white and bright and dull finishes and in matt and bright coloured varieties. Coated papers form a first class basis for really charming colour work in fine detail and are specially suitable for the letterpress process of printing. In the high surfaced series of coloured coated papers, the finish of the label is bright and glossy but they may be additionally treated with a coating of varnish after printing in the case of the high class food product or bottle label.

Gummed fancy label paper, calf and leatherettes, metal lined and foil coated papers, steel blue and printed designed background papers are also available and these supply the need of individuality, special purpose and other quality requirements. All of these papers may be likewise specially gummed with any recipe to adhere to some kind of everyday or difficult surface.

User's own packaging or wrapping paper may be gummed to any special recipe in the reel or web form or it may be strip gummed as required.

The producers of famous branded noncurling gummed label papers maintain a fully equipped technical section where every kind of adhesive problem may be overcome as a result of field tests and experimentation. The skilled services of the specialist in label paper manufacture are always at the disposal of the packager with a labelling problem to solve.

Speciality Gummed Label Papers

Tropical Gummed Label Papers.—A special coating has been designed for use in the Middle and Far East where conditions of extreme heat prevail and ordinary grades of gummed label paper would prove unsuitable. Labels produced from tropical gum paper will not block; labels may be printed in this country but sent to the tropics for application. Made and available in white, the coating may be applied to coloured papers for suitable quantities of label work.

Superstik Label Paper.—This is the most powerful adhesive known for labelling and will adhere to many difficult surfaces such as plain and lacquered tin, ebonite, varnish surfaces and all metals. It will stand up to freezing conditions and the process of freezing. In addition to white basic papers, for a really strong label this recipe may be coated on to a brown or coloured kraft base paper.

Stick to Glass.—New formulae have been developed for strong and speedy adhesion to glass with all its special surfaces; this quality is therefore ideal for bottle labels or may be used for price, code and weight tickets on glass packaged products in the food and beverage trades.

Glastik.—For the packager producing shop window suspenders, advertising matter relative to products, glastik is ideal for such purposes. Many manufacturers often pack

display and advertising materials with consignments of goods and glastik may be specified for the window sticker. Such a paper is quickly applied to glass surfaces and may be easily removed when no longer required.

Fish Glued Label Papers.—As the name implies, this is a base paper of a strong type specially coated with a fish glue recipe for strong and instant adhesion to difficult surfaces of wood, fibre and other packing cases. Made in several thicknesses or substances it may be suitably printed by the letterpress process of printing in the form of square, rectangular or a punched-out label shape with individuality.

Double, Treble Dextrine or Pure Gum Label Papers.—Rough wrappings and surfaces often require a label paper with an extra coating of gum and either a double or treble gummed label paper will fill this need. Where purity and freedom from odour is desired, pure gum label papers should be used. These grades are also used for box labels, shipping labels, parcel and packet labels, price tickets, seals, cameos and brand labels. Made in white, colours may be obtained where suitable quantities are involved in a labelling operation.

Gummed Both Sides.—This may be used for window bills and suspenders or where two surfaces are required to adhere closely together. Such a paper may be used either inside or outside the window. Sometimes referred to as a sandwich gummed paper, it has other uses in connection with bonding, laminating or binding two materials together.

Parchment Gummed Papers.—A transparent or semi-transparent adhesive material is often required and suitable papers are made for such purposes as jam pot covers, milk bottle caps and for window bill advertising purposes. Made in transparent, semi-transparent and opaque grades in standard size sheets.

Quicktac Label Paper.—A strong label paper with a very tacky adhesive coating and one designed to stick to tea packets in particular and where label application in connection with end packeting and sealing of pleated or folded ends or flaps is involved. Often these ends are very springy and will resist ordinary grades of label paper.

Autofeed Noncurling Gummed Paper.—This is a recent development in gummed paper which enables the printer and large label producer specialist to feed into the printing press gummed paper with extra speed. The special adhesive coating has all the properties of ordinary gummed paper with the added advantage that it will feed into automatic feed machines with perfect ease and good speeds. This type of label paper punches out to shape and cuts under the guillotine much more easily than ordinary grades of label paper and does not blunt knives or cutters and presses so quickly. There is no additional cost to the finished product and this grade of gummed label paper may be considered as the paper of the future.

Easipunch Gummed Label Paper.—A new grade of label paper specially produced renders the shaped label easier to produce. It punches well under the guillotine and the press.

Tinted Pulp Gummed Papers.—As an alternative to white, label papers are produced in colours based on tinted pulp or uncoated grades of paper. There are fine, extrafine and superfine qualities which have a relation to quality, depth of colour and suitability to printing process. They may be printed either by the letterpress or lithography processes of printing. A black shade is also included in this series. Special colours outside the standard range may be made to order for suitable quantities.

Clay Coated Gummed Label Papers.—There is perhaps nothing like a coated paper for a first class label and the beauty of design in combination with colour and printing artistry, can produce some outstanding food and beverage labels of all kinds and shapes. The fine and even surface of the clay coating on to base paper brings out the true richness of printing inks, improves the finished appearance of the label and definitely enhances its true eye appeal and advertising value when affixed to the product. Clay coated gummed label papers are made for all processes of printing, i.e. half tone, three colour, litho, offset and for the printing of metallic inks. Made in white, bright and dull finishes, and in many rich colourings, they may be considered for the really high class label job.

Flints, Imitation Gelatins and Friction Glazed Label Papers.—Made in white and many colours, they are rich, glossy and smooth and make up into very bright labels. They are used for seals, box tops, chocolate and food wrappings (in a plain or ungummed form) bottle labels, making up into colourful but comparatively inexpensive labels. Some grades may be further treated with a coating of lacquer or varnish after printing. In the case of steel blue papers, they may be printed in gold, and metallic inks generally either by letterpress or litho processes of printing and are ideal for wine and high class beverage labels.

Cast Coated Label Papers.—The recent glosscoat label papers made and branded under various trade names are also obtainable gummed and produce first class high gloss labels and obviate the need for after treatment by varnish, lacquer, cellulose or similar coatings.

White Enamels and Chromos.—White box enamels with bright, medium or matt finishes are also available with gummed coatings for box and bottle label work. Made in several weights or substances, the finish should be chosen to suit the product.

Samson Glued or Gummed Label Papers.—Where a very strong paper and tacky adhesive is desired, Samson label papers may be used. The breaking or bursting strength is very exceptional and the glue adhesive coating ensures a quick and firm stick to many difficult surfaces such as glazed

or M.G. (machine glazed), krafts, wood and other hard surfaced material used in both packaging and packing. In end sealing, many types of packets are very springy, and to overcome this springiness of the wrapper or carton, the Samson type of label may be used. These papers are also coated on both sides and may be used for bonding or laminating two materials together. Used for packet labels, wooden box labels, seals and merchandise packing seals they are worthy of consideration where a really strong label is required.

Tinted Enamels and Surface Gummed Label Papers.—Coated papers have a very definite advantage in label work as their fine coloured coated surfaces are capable of producing first class designs and printed results. It is possible to obtain brighter and more definite colour in a coated paper than a tinted pulp type of basic paper. It assists the printer in his craft and such papers may be printed by the modern processes of printing and in full colour. Surface papers are flat or matt in finish while enamels are bright and glossy so that either may be used for the desired effect—subdued or brightness—in the finished label. The colour range is extensive and special tints and tones may be made by the coating mill for comparatively small runs of a colour. A packager may use a surface or enamel paper plain for his wrapping and use a similar type and colour paper for the label thus obtaining colour scheme and package harmony. They may be obtained in sheet or reel form for label production by all mediums and for use on automatic packaging and labelling machinery. Subdued or vivid colours may be selected as applied to a chosen product either cartoned, packaged or bottled. They may be varnished in most cases after printing, thus further enhancing label appeal and durability.

Metal Papers Gummed.—The use of adhesive seals and cameos for packaging has now grown very rapidly and many types of metal lined in gold, matt and bright, aluminium brushed and bright and many colours have been introduced for the label user and the packager of all kinds of products. The tinfoil, gold foil and gold bronze series of label papers have been developed to meet the need of a less expensive label paper of quality. Gold leaf papers are made for high class label work. Extra brilliant metal lined foils are made for tip top label work and make up into the most attractive type of seal. In recent years, there has been an increasing vogue for printing on metal paper as it appears so bright and attractive when used on products under conditions of artificial lighting. Metal papers of all kinds have exerted the talents of the ink specialist and the printer who is now producing some new effects in metal paper printing. For high class packet, seasonal seals, bottle labels, metal papers may be considered. In addition to dextrine gumming, double seal gumming and other strong adhesive recipes are available for the seal and label specialist who uses such papers in sheets, reels and coil form.

Calf Papers Double Seal Gummed.—With every appearance of smooth fine calf or leather finish, these label papers are

specially favoured for the production of high class seals and labels. The surface is waterproofed and is specially treated for gold printing and blocking processes. A quick stick is generally necessary and the double seal gumming recipe applied to these papers ensures the maximum adhesive powers.

Gummed papers are made and obtainable in 18 in. x 23 in. 20 in. x 25 in. and 20 in. x 30 in. packed 500's to a ream. Larger sizes may be obtained if desired and reels, rolls and coils of special width, diameter and feet per reel or coil may be specially made up to order. Gummed label papers may also be supplied perforated at intervals. Gummed papers made by the leading makers are branded, and wrapped in an inner packaging of wax paper as a protective measure and this should not be removed until the paper is actually required for conversion or usage.

Many new recipes are being constantly formulated and these are often produced as a result of users own special needs and problems in labelling and sealing.

The Noncurling Process.—Basic paper, or body material as it is termed, is coated with one or other adhesive recipes in the continuous reel. It is festooned dried in the reel or web, re-reeled, noncurled, finished with a special finish such as is provided by calendering to smooth or high finish, rotary machine cut to sheets of selected size, sorted and counted, guillotine trimmed at the edges and packaged in reams. One of the most important processes the best branded gummed paper undergoes is the noncurling process which makes it possible to print it with ease, use the final printed label without the likelihood of supplies blocking or curling and permits of label stocks remaining flat in stock and fully adhesive. Sheet gummed paper as opposed to reel cannot however, be broken or noncurled; it can only be treated by hand methods which are not so entirely satisfactory.

In the noncurling process, the complete gummed surface is scientifically broken up into thousands of individual particles of gum and thus is no longer a complete all over surface of adhesive. Each particle of gum absorbs its own moisture. The finished product—gummed paper—consists of two materials—paper and gum—and these are both hygroscopic in character. According to the relative humidity of the atmosphere each material assumes a certain degree of moisture content. Gum is more hygroscopic than paper, so that the rise and fall of humidity will expand the gummed label paper that has not been noncurled causing it to curl. The whole process of noncurling has now become simplified but it is nevertheless very important to the printer in his process of printing and the label user in his application of the printed unit or label. Gummed paper will lie flat at all levels as the gummed surface, being broken up in all directions, does not present one complete moisture absorbing area.

Label Surface Finish.—Size or sizing is included in the furnish of basic paper for gummed label work, but the degree of sizing varies in content. Papers are soft, medium and hard sized and where a label paper is required to be surface treated with varnish or nitrocellulose after printing,

as is frequently carried out in can and bottle labels, a hard sized paper should be chosen for the job; a coated paper will varnish better. This sizing resists spirit varnish penetration into the body of the paper. At the same time, the printer is vitally interested in paper surface and finish and the degree or depth of finish enables him to obtain higher results from screen half tones by the letterpress process of printing. Open and loosely knit paper surfaces give spongy results on the press but coarser screen blocks may be used to overcome this type of finish in paper. The finer the paper surface, the finer the screen of block and the better and more faithful the detail will be in the finished printing. To carry the question of paper surface a step further, as has been pointed out, clay coated surface papers, such as enamels, surfaces, chromos, flints and friction papers in general, give first class printing results.

Useful Hints in Label Paper Storage.—All stocks of label and plain paper should be carefully stored off cold stone floors, and away from strong sunlight, draughts and damp conditions. The heat of steam pipes is detrimental to paper and board stocks. Paper pallets are best for paper storage as the material may be stored away or stacked in tiers on the pallet which permits of a current of air to circulate underneath thus assisting in some cases, in paper seasoning or maturing. Palletized paper may be moved without manhandling by the use of a trucking device so that supplies may be conveyed from stock room to production line without handling package by package. Gummed and coated papers should remain in their original wrappers until required for use. Broken edges and ends of reams or kraft wrapped paper packages should be sealed to prevent damp penetration. At the same time, sunlight will cause fading at the edges of paper stocks where exposed. It will also bring about edge cockling, waviness and blocking.

Blocking of Label Papers.—The above precautions will prevent this where the best grades of label papers are used. Blocking means the activation of adhesive coated surfaces in the stock pile or package which results in the inability to separate the individual sheets of paper. Scientific control of the constituents and new recipes have entirely eliminated these possibilities, even in humid conditions, but good storage is essential to the maintenance of supplies in first class condition. One of the chief advantages of gummed labels over paste or adhesive and plain paper is the fact that labelling can be clean and neatly carried out without the danger of finger marks and wrinkles in the applied label to surface. Furthermore, a gummed label carries the correct amount of adhesive in weight and coverage for all types of labelling work and this degree of precision is not possible in hand-controlled methods of labelling. The absence of liquid adhesive in a food manufacturing plant is often vital to cleanliness and good clean packaging of the product. A gummed label if efficiently moistened, may be said to be all there!

Label Paper Choice.—With so many varieties of adhesive coatings and paper surfaces, plain and coloured, the choice

of label paper is important, particularly where difficult surfaces are involved. Advice should always be sought from the label supplier and field tests made under working conditions in order to ensure that the correct paper for the job is being used. It is sometimes difficult to stick some really difficult surfaces satisfactorily with gummed labels but these problems are being investigated in the laboratories of the label paper specialist. In the meantime, there are heatfix or heatsealed label papers, self-adhesive or pressure-sensitive labels, transfer slide off cellulose labels among other varieties and these are fully discussed in this chapter. Concluding this survey of gummed label papers and their application, the gummed label has not yet so far been widely employed in processes of automatic labelling by machine methods, but the existing mechanical problems are fast being overcome and the field for gummed label usage will therefore grow in volume. In the meantime, hand and semi-automatic labelling machines are available which spread the correct amount of moisture over gummed surfaces ready for application to produce or package.

Heatsealing or Heatfixing

Some types of viscose filmic wrappings possess heat-sealing qualities so that the product is merely wrapped therein and seam or end sealed by the simple means of heat and pressure, without the aid of moisture, either by hand iron or hot plate or by some attachment fitted to a filling or packaging machine. In this chapter, we are not concerned with films with inherent heatsealing qualities present (these are dealt with in the chapter dealing with wrappings) but with thermoplastic labels, applied by heat and pressure, by hot plate, roller or automatic machine methods of application to package or surface.

Many new and hard surfaces used in current packaging projects often present some difficulty at the point of labelling and it is here that the heatfix, heatseal or thermoplastic label serves the purpose of a seal label or closure. Many types of non-absorbent surfaces used in the make up of packaging containers such as plastics, metal, glass and similar smooth surface will often resist other types of label and in such instances, heatsealing can be the answer to labelling problems. Heatsealing or heatfixing is not an entirely new process although there have been considerable developments both in types of coating to basic paper and methods of application. Paper adhesion to surface by means of heat and pressure has been practiced for some years in the showcard and mounting trades. This work is undertaken by means of a heatfix wafer coated on both sides with a shellac or with one of the more recently formulated recipes based on polyvinyl acetate. Placed between two surfaces of paper materials, with the aid of heat and pressure, a perfect bond takes place. The application of heatfix papers in the field of packaging, has special uses in the food and beverage trades. This is as a result of the growth of the synthetic resin and rubber industries which have assisted in the development of this method of labelling by hand and machine processes. Prior to this progress, few materials were available to the paper converter interested in the production of heatfix or

heatseal papers. Natural resins such as shellac and gutta-percha and the by-products of the petroleum industry, i.e. paraffin wax, put a limit to the development of a range of heatsealing papers for packaging and labelling purposes.

Heatsealing, heatfixing, thermoplastic labelling and sealing, dry labelling and dry mounting are some of the descriptions given to this form of labelling but they all add up to the same thing, that is the application of a resin coated label paper to a container, package or surface with the aid of heat and pressure.

The heatfix coating which takes up the heat may be simply described as a synthetic product made to a standard of consistency unknown with natural materials and in a range of viscosities, solubilities, melting points and adhesive strengths, which have enabled the laboratory specialist to design the current series of heatfix papers for many packaging projects.

Instant and Delayed Action Tack.—There are two main types of coatings applied to heat-seal papers—it must be understood that these papers are quite separate from films and transparencies with inherent or added heatsealing properties which are used in large quantities in food and beverage wrapping and packaging projects.

(a) 'Imatac' is the trade name for a type of heatfix paper which has instant tack. These papers are immediately activated by the application of heat while in contact with the package or surface to which they have to adhere. When the applied heat is removed, the coating sets and cools off almost immediately and it is important that such labels should be applied immediately. The question of accurate label positioning is important and care should be taken by the label operator as they cannot be moved into another position after initial application.

(b) 'Delatac' is another trade name given to the other series of heatfix label papers. When a Delatac or delayed action label is heated, it will retain its adhesiveness some minutes after the source of the heat has been removed. There are several advantages to this type of label as the label may be moved round into the best position before finally pressing it down to surface. Labels are moved with cold rubber pads in some processes of labelling. Labelling may therefore be carried out away from the actual product or surface. Heat-sensitive and very fragile articles may thus be efficiently labelled without the likelihood of harm or breakage, this method having a special application for packaged cakes, biscuits, chocolates, confectionery and many other food products. This relatively new paper has enabled the packaging machinery experts to formulate machines where the heating may be arranged as a separate operation coming together at the right moment. At the same time, the reduction of what is termed 'time dwell' in this process of labelling enables more speedy production on the packaging line.

Its Special Applications.—This process of labelling by either instant or delayed action heatfix label papers has a special application in the food, confectionery bottle labelling, biscuit, cake and allied trades and this is borne out by the

increasing number of packagers who are currently adopting this method of sealing and labelling. In the food trade, the absence of water in many instances is important and in view of the fact that hands and appliances may be kept clean and dry, this process adds much to hygienic and clean labelling operations.

Labellers using liquid adhesive or gums and plain paper labels in their labelling projects will know of the preliminary mixing problems. Liquid adhesives have to be maintained at a level with efficient mixing and gumming machinery must be constantly cleaned down. Heatfix makes it possible to apply a label quite flat to surface without wrinkles or creases and there is no necessity to wipe down package surface. Defective labelling is claimed to be ruled out in actual label application, the applied label being neater and quicker to apply. It should make an appeal in high class labelling in addition to its special facilities for difficult surfaces. It is also claimed by the makers of these papers that labelling speeds are from two to three times as fast as is the case with ordinary adhesive labelling machinery production. There is a greater variety of difficult surfaces or containers types which may be so labelled permanently and neatly. Laminating, wrapping, sealing packaging and labelling are among some of the operations now made easy with the aid of heatfix papers. The fact that the heatfix label sets fast and immediately means that it has no opportunity to 'move' its position as is sometimes the case with other types of label application.

In the food trade, the cold application of a label in the case of some product labelling operations is important and in such instances, delayed action heatfix should be employed. Soft packed products are not broken by high pressure during label application. The labels are waterproof and weather-proof as the resins used in the coating are not water soluble. Where returned empties or glass containers are involved, labels may be removed with the aid of some suitable detergent. Containers used in the food and beverage trades made from such materials as glass, transparent films, acetates, rigid and semi-rigid plastics, printed wrappings, printed and lacquered cans, and aluminium containers may all be suitably labelled by this process. It should be pointed out that some materials have not yet proved receptive to this form of labelling and among these are polythene and silicone treated glass, but new surfaces are the subject of constant experiment and it is easy to prophesy that such problems will be overcome in the future. Tests should be made under working conditions in the case of new containers or difficult surfaces.

Cost Comparisons.—Initial costs of heatfix papers are higher than some other forms of labelling and materials but this is offset by faster application of label to surface, neatness, freedom from smears, the absence of wrinkles, perfect all over adhesion, no final wiping of label to remove moisture or excessive adhesive, and no polishing, every label being perfect. It is also claimed by users that label rejects are substantially lower. On semi-automatic labelling machines, an efficiency figure of 55 per cent was raised to 70 per cent faster—these figures refer to the percentage of the theoretical

output of a machine, if in each case, the machine has been operating in full production without any trouble, every minute of a working shift.

Base Material now Used in Heatfix Labels.—Heatfix recipes may be strip coated in a specified position on plain paper in the reel or in the flat sheet and in this way it may be used for wrapping or over-wrapped products, merely being sealed along the strip edge. Packager's own wrappings may be either strip or all over heatfix coated with one of the various recipes now available. Some of the standard types of heatfix papers coated and readily available to the printer or packagers are white and tinted pulp printings, clay coated papers such as enamels, surface and chromos, the new Glosskote or Chromcote papers with their high plate glazed surfaces, cloths, fabrics, linens, both metal lined papers and bronze powder coated foils among several other grades of the paper and cover material.

Reference has been made to a heatfix wafer and in this case, a base paper is coated both sides, the finished product having an application in the process of laminating, bonding, fixing, and mounting two materials or surfaces together. The work is simple and carried out merely by heat, pressure and ironing. Heatfix coated strip or tape is used in processes of coil winding as most forms of adhesive tape can bring about corrosion and heatfix tape will overcome this possibility.

The Self-service Stores and Heatfix.—Retailers in the food and allied trades are finding the heatfix label ideal for adding code, weight, price and other necessary details to film and other packaged food products. The label is merely ironed on with some kind of hand iron or hot plate as is convenient in the shop or store. Heatfix is used for the header bag label, the printed double fold over label being employed to close and seal film packaged foodstuffs, nuts, and confectionery. The heatfix label is experiencing rapid development in its use in the biscuit packaging trades where nationally known biscuit makers are using heatfix end labels to seal and brand the product. Stock printed heatfix labels are readily available for many trades not the least the food and allied trades. They are also used for moistureproof, viscose wrapped products, for sealing and labelling articles at the ends and seams, and for combining cloth and silk to other base materials in high class and gift packaging projects. The ironing of one material to another is all that is necessary. Small label printing machinery and the Tickopres in particular are capable of over printing and printing all kinds of labels in reel, coil or sheet form ready for application in the shop, store, the supermarket and the self-service stores.

The Application of Heat and Pressure.—Heatfix or heatseal papers are made for use in tropical countries and these papers have a high melting point. They should be specified for the country of actual usage apart from everyday label papers for the home trade. The standard grade of label paper begins to block at 140°F. and it is normally tacky at 180°F. The normal working temperature of the heat activator is as much as 250/275°F. The extra temperature is needed to activate the adhesive coating quickly, after the initial action

of heat penetration into base paper. Extra temperature is needed to activate the coating quickly. There are three most important features which must all play their part in the process of heating and these may be briefly summed up as follows:

1. Temperature or the degree of heat to which the adhesive is exposed.
2. The time dwell or seconds, or fifths of seconds the adhesive is exposed to this heat.
3. Pressure or the factor which is used to apply, either by hand methods or by machine, the label flat and firmly on to the surface of the container or package.

All these factors are interdependent and should at any time one of them be varied, then the other two remaining factors have to be changed forthwith.

Heatsealing machinery specialists have produced a whole series of simple hand hot irons, hot plates and hot rollers all of which have an application in the process of heat-sealing. Fully automatic heatfixing machinery and units for packaging machines are also available designed for the food and beverage trades among other industries. There is a very wide series of heat crimpers and other units, most of which are or can be thermostatically controlled. Semi- and fully-automatic machinery feeds the package into the machine at a rate of some 300 units per minute. The semi-automatic machine has the article to be sealed or labelled fed into it and in most cases, is removed by hand. The speeds of unit labelling are around about 50 to 60 per minute in most cases. Progress continues both in the U.S.A., on the continent and at home in the design and manufacture of new and improved heatsealing machinery as undoubtedly this process is one of the future, particularly for food and beverage labelling and sealing packages and bottles.

Printing Hints.—All the normal techniques applied by the printer in machining of everyday grades of paper may be used in printing heatfix papers but printing inks containing solvents which activate the adhesive coating on the paper should not be used. Here again, special inks have been formulated and may be specified to the ink suppliers. Set-off of the printing ink should be avoided and similar printing problems such as these will impair proper adhesion of label paper to surface when used for label work. Letterpress, litho and gravure give the best label results in monotone or colour and the paper may be printed in the flat sheet or on the continuous reel. Separation of punched out or guillotine cut labels should be undertaken by flicking edges so that they do not cling or bind. All the usual precautions outlined for paper storage should be employed and there should be no extremes of heat in the paper store. The heatfix paper itself is much less susceptible to atmospheric changes of humidity than other types of uncoated or plain paper and board.

Biscuit Labelling Application.—Heatfix packet end labels are now used by the leading biscuit manufacturers both for hand and machine application. S.I.G., Forgrove, Rose Bros., Forsters, Douglas and other packaging machinery

experts are all well equipped with appliances for use either from the coil, reel or hopper.

Food and Confectionery.—Header or saddle labels printed on heatfix label paper form an eye-catching moisture vapour barrier closure and seal for food and confectionery packaged in this form. Header labels may be attractively printed thus advertising the product in addition to enclosing. The new Bland machine is ideal for this form of closure.

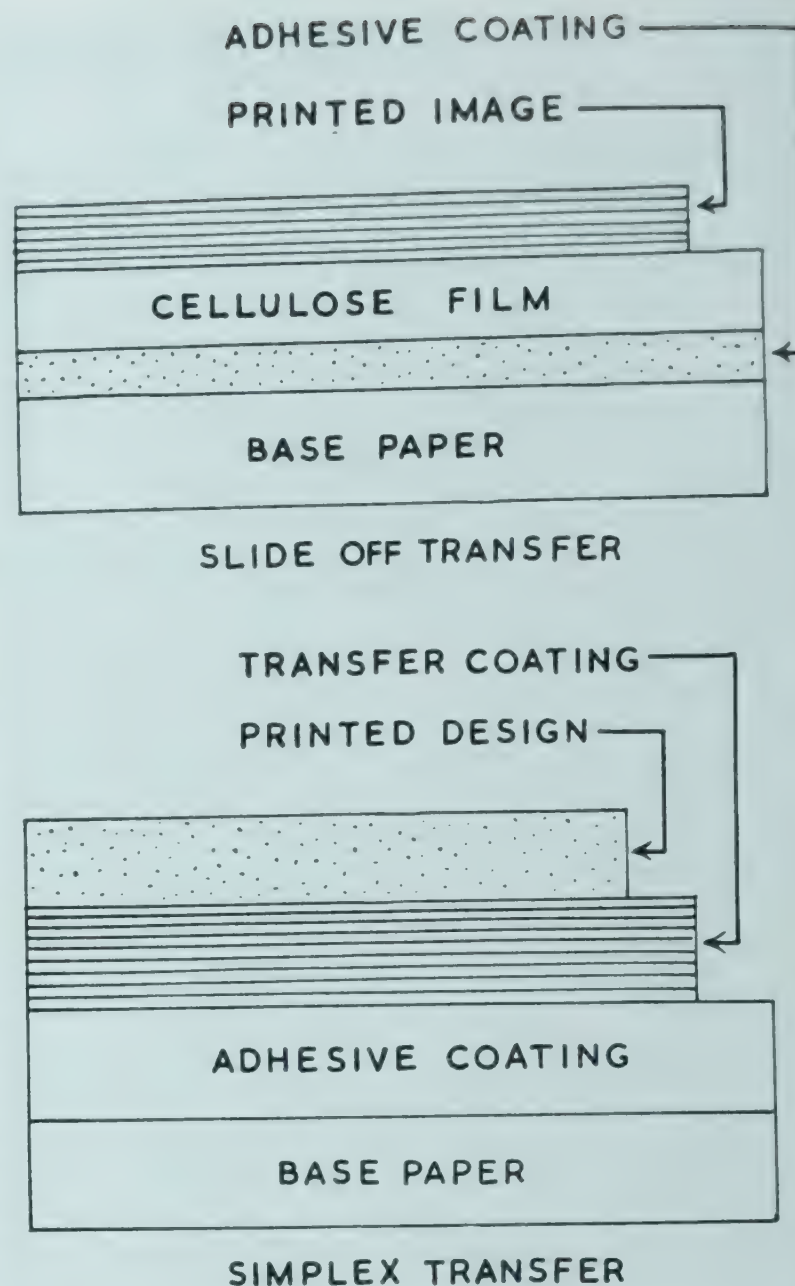
Box Making.—A heatfix coated thick kraft of considerable breaking strength is used on single and quad corner stay machines with every success. Waste which occurs with wet moistened glued stay paper due to stoppages is therefore eliminated.

Container Making.—Tubes are made and cut into lengths, placed on a former and the ends are then turned over. Tops and bottoms are made from board coated with heatfix and are then sealed to the tubes. Dome shaped boxes used in some powder and fancy product packaging operations are made by two heated dies and the top label is applied at the same time as the box is domed to its attractive arched shape. The time required for this operation is a good deal shorter than when gumming with wet adhesives. Dome top boxes are used for conserves, figs, ginger and preserved fruits of many kinds packaged in gift and seasonal types of boxes.

Heatfix Label Designing.—Label designs for the printer should be laid out in such a way that when applied to a curved surface such as a glass bottle or container, the grain of the paper will run up and down, i.e. parallel to the axis of the container. In the case of label application to a flat surface, the grain should run parallel with the lines of print. Concluding this survey of heatfix label paper, it is also well to point out that any varnishes used at any stage of the label production should have a melting point higher than the adhesive coating on the paper. Printing varnishes have been found more satisfactory in this respect than spirit varnishes.

Transfer Labelling

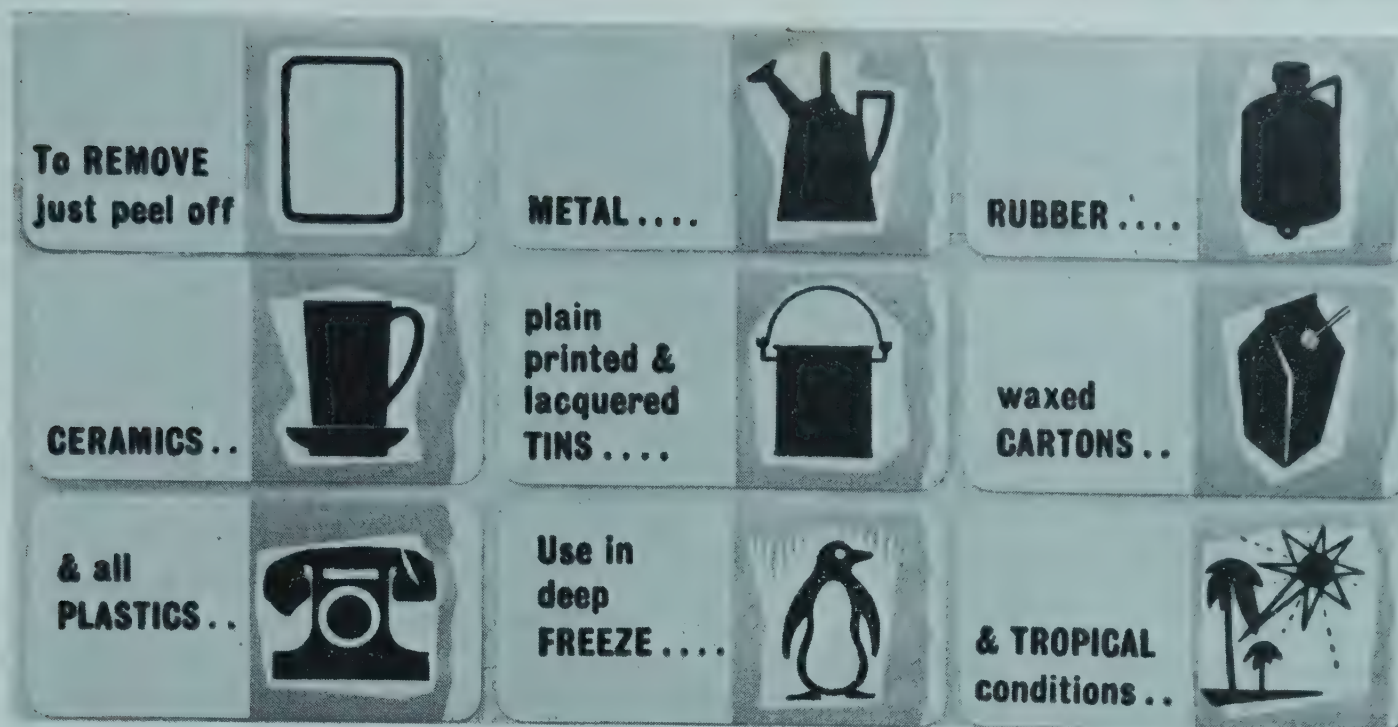
The slide-off transfer, or transparency as this form of labelling may be termed, is another aspect of permanent labelling and branding products and articles having a special application to bottled and glass packaged food and beverages as the transparent character of the label does not obscure the contents of the container which may be seen through the label itself. In the case of bottled liquids with a rich colour, such a label looks most attractive on the displayed product and in shop windows both by natural and artificial lighting. Glass jars, bottles, dishes and containers of all kinds made from transparent material are ideally suited to transfer labelling where the product is in the medium to high class range. Any product which is sold by eye appeal, and much of this can be bound up in the label, may be considered as suitable for the slide-off variety of transfer, giving a permanent form of label. New types of cellulose transfer paper used by the printer make it possible



The make-up of the coated cellulose and simplex transfer.

to obtain first class results at economical prices. Current cellulose coated transfer papers may be printed by all the processes and silk screen printing with its rich colourings is able to produce some outstanding eye appealing labels. A transfer paper may be printed by all the processes, the method of printing being governed by quantity, colour and style and occasionally by the method of label application. They are easy to apply by merely dipping the printed transfer in water when the design or image may be moved off the backing sheet with the fingers. Transfers of the cellulose type are flexible and may be moved into the best position on the product or surface and when dried out they become fast, permanent and washable.

Their Application.—For the purpose of food and beverage labelling operations, this review takes into account the cellulose transfer label and not the starch coated industrial label used to mark and brand such items as industrial machinery, showstands and showcases, cabinets and fitments in shops and stores, deep freeze appliances, woodwork and



Illustrating surface application of pressure-sensitive labels.

similar fixtures which are usually name or trade mark branded by the maker. The transfer labelling and branding of glass, tinfoil, metal, plastics, films, wood, polythene, waxed material and other mediums used by the food and beverage trades is more suitably carried out with the cellulose slide-off transfer type of label.

Cellulose transfer papers should be printed in heavy rich colours such as may be applied by the silk screen process of printing. In this process, several colours may be printed for comparatively short runs or quantities of labels at economical prices. This is not possible by letterpress or litho printing where longer runs are necessary for economic reasons. The warm rich lustre of screen printing inks is capable of producing the most attractive type of label. Fine letterpress, where this is necessary, may also be reproduced. The shape of the label may be designed to fit the contour of the bottle or glass container.

Cellulose transfers may also be used as a window transparency medium so that packager's name, brand and special announcement may be printed on this type of basic material, included with the packed goods and used by the retailer in the interests of the manufacturer, the packager and his products. In this way, special selling campaigns may be announced via the retailer who will find no difficulty in applying the transfer inside or outside his shop window.

In the actual application of the transfer to surface, there are no mechanical means of use to apply the label to product or surface. They are merely dipped in water, warm for preference in cold weather, when it will be found that the printed image on the cellulose film may be slid off with the thumbs and fingers and transferred on to the desired surface. The backing sheet of the transfer is very porous and permits immediate absorption of water to release the film, which is both tough and flexible. It is then placed on the surface and moved into the best position. Any air bubbles may be removed by hand pressure so that creases and wrinkles may be obviated. There is no stretching or distortion in the

application of the smallest sized transfer brand label to the very largest window bill or transparency. The printing of the cellulose transfer is carried out positive so that the printed design may be seen to view. In sliding off the transfer, the design or picture therefore is not placed face downwards as is the case with industrial starch coated simplex transfer labels. It is moistened face upwards. Transfers of all kinds are best stacked away in store until required for labelling, on their edge and not flat. This method of storage avoids pressure upon a sensitive printed surface. In some cases, the printer will interleave transfers with tissue.

The removal of an applied transfer needs a suitable solvent but brand labels which are permanent are those on the product for all time. Transfers may be 'baked' into a surface and thus become a really permanent part of the article and form a brand mark which cannot be removed. Transfers are used for decorative designs and manufacturer's emblems or trade marks. They may in such cases be treated with a coating of varnish or nitrocellulose in order to enhance further the colours in the printed design and render it absolutely indestructible.

Printing Hints.—No special knowledge is required by the printer in all the various processes by which cellulose transfer paper may be printed. However, in the case of the simplex or duplex type of transfer paper, this is a specialized industry and a limited number of printers set themselves out to print and produce industrial transfers for machinery and furniture branding.

Label design and style can be quite free and it will be found that the best results may be achieved by using inks of the deepest hue and this applies to all processes of transfer printing. Indifferent results are often obtained by using the normal inks unless a background of white has been built up to bring up the colours which follow-on. Heavy undercoats of printing ink provide a pigment which will carry the

printed image without any danger of distortion. To avoid the building up of backgrounds on cellulose transfer papers, special deep colour inks should be used for printing. Some printers print at least twice in order to obtain a good rich depth of colour; some types of transfer printing work may run to as many as 12 separate workings. Advice on transfer papers may be obtained from the label printer specialist.

Ceramic Transfers.—Packaging, branding and decorative product presentation in special containers such as caskets, boxes, glass vessels, china, porcelain and glassware in general may incorporate the ceramic transfer with its rich colours and specially chosen designing. The finished appeal of this type of transfer is comparable with the best hand painted effects. Such transfer production is possible as a result of modern techniques and new transfer papers for such purposes.

Another recent development in this field is the printing of pure metals and inks such as gold lacquers direct on to transfer papers, the finished work being applied to glassware and porcelain. Considerable progress is now being made by the silk screen printer in the printing and application of rich colours on to almost any type of surface via the transfer using various basic material as a background. Silk screen printed transfers are hard and flexible and may be handled in the application of printed design to product without any danger of break up or distortion.

Transfer Designs.—In the initial transfer design, those which follow the contour of the bottle, jar or package can be most appealing. Certain areas of transfer background should be left open in order to permit the light to show through and give a desirable 'look' into the glass jar or bottle. While the shape of the design may follow the normal principle of label style, shape does mean something in this field of labelling. Colours should be fast to light or non-fading as transfer labelled products usually find their way into prominent places in the window of the shop or store and in the full glare of publicity. It is better to leave the design to the specialist who, in conjunction with the packager, can produce some first class designs.

Paint Transfers.—These transfers are now becoming popular for marking, branding and labelling metals, wood and glass packaged products and articles. Colours are extremely rich and full bodied, being at the same time waterproof and permanent. This type of transfer may be direct stoved with a non-cellulose stoving varnish. In addition to glass and wood, these transfers may be applied to paper and cardboard packaged items but only in the higher grade range of products. They are washable and fast against discoloration or fading. Products may be exposed to strong sunlight without cracking or flaking. Here again, the printed transfer is merely dipped in water and slid off ready for placing on to the desired surface. Characters consisting of completely separate letters or components are also available in this type of transfer and can have an application in packaging and product presentation. Such printed transfers are supplied

sandwiched between two sheets of backing paper and one of these is stripped off after moistening, ready for application to the surface. The second sheet is then firmly squeezed into position on the surface, and after the adhesive has taken effect, the final backing sheet is peeled off. Where a really high class product is being launched, whether packaged in glass, tinsplate, plastics, wood, cellulose film, lacquered metals, laminates, varnished or polished smooth surface, chinaware or veneered surfaces, gift caskets or fancy boxes or other unusual material currently used in gift presentation, the slide off cellulose transparent label may be considered. While its cost is perhaps the highest of all forms of labelling, its eye appeal and display value cannot be assessed in terms of initial outlay.

Pressure-sensitive Labelling

This may be considered as the most advanced form of labelling and is a process where the label is in a state of permanent activation and does not require heat, moisture or gum in order to make it adhere to a surface. They are applied to surface by finger pressure and may be peeled off when no longer required. In this way, they serve the purpose of a point of sale label carrying price, size, code or weight detail or the type of matter which is no longer required by the consumer after purchase. They are made to adhere to metals, rubber, ceramics, plain, printed and lacquered tinsplate, cans, waxed cartons, all plastics and may be used in deep freeze packaging and in tropical conditions. When peeled off, they do not leave behind any residue either on the fingers or the surface of the package or article. They are ideal for pricing and weight marking in the self-service stores and the supermarket.

Branded grades of pressure-sensitive labels are made up in sheet form attached to a glassine or kraft backing sheet so that they may be peeled off when required for use. Precision mounted, they may be printed in register by the printer, hand written or typewritten. Standard printed tacky labels may be overprinted in perfect register. Product, article price, code and detail marking labels are made in white and some colours so that they may be used to conform to a colour scheme. The shapes are wide and varied and comprise a useful range of circles, squares, rectangles, ovals and other shapes which may be chosen to harmonize with the shape and style of the product being labelled. In addition, silver metallic and gold metallic have now become available and such base materials as bright gold and silver metal lined papers, white glosskote, silver metallized, transparent acetate and films are also available in this form of adhesive. The labels may also be supplied in reel form for mechanical application to product. This is a convenient form for medium to large labelling operations.

Apart from the range of stock sizes held, special presentations are available and these include centre hole punching in circular sizes for use in conjunction with 'washer' types of tie on labels. Self adhesive label papers are also made in sheet form size 20½ in. x 30 in. and these carry individual 'split back' labels for point of sale stickers from which the printer can produce separate labels printed in full colour for

STAR

**...is Beer at
its Best**



Self-adhesive split back label provided on metal foil in two colours.

application in the same way, i.e. by finger pressure. The large self adhesive label produced from this form of make up is ideal for window bill work and glass suspenders as they are so easy to apply and as equally easy to remove when no longer required.

Self-adhesive Tapes as Seals.—Self-adhesive, pressure-sensitive labels, or tacky labels as they are alternatively called, undoubtedly grew out of the use of self-adhesive tape in industry as a similar adhesive recipe is used in its manufacture. The permanently tacky adhesive in both cases comes from the constituents of the adhesive and is in no way due to the presence of solvents which can evaporate and leave the adhesive hard and use less. The backing sheet on to which self-adhesive labels are mounted in position may be bended backwards so that individual labels may be stripped with the fingers, or in the case of machine application, taken up quickly as the reel on which they are mounted revolves. Tacky labels will not loosen their grip or deteriorate under reasonable storage conditions.

The intrinsic cost of tacky labels is somewhat high owing to the quality and value of the raw materials used in their manufacture and the number of processes which the material has to undergo. However, for the service they can render in speedy and efficient labelling, point of sale pricing and coding, the cost is repaid in their ready adaptability in the field of retail selling among other forms of usage.

Tacky tapes may be printed in as many as four colours at suitable intervals along the length of the tape thus forming a very useful type of packet and product strip seal. Seasonal stock patterns are also available for gift packaging and seasonal wrapping operations.

'Tackytite' Self-adhesive Labels.—This is a brand new type of pressure-sensitive label where the adhesive coating is in a permanent state of activation and is applied to the product,

again without moisture, heat or gum. The label, after some seconds, becomes permanent. This is an ideal means of branding, pricing, coding and marking products with special speed and ease of operation without any outside agency, the label becoming a permanent fixture. They are useful in the factory for coding batches of products in rotation, the colours readily assisting in identification of a group or series. They may be used in the production line as symbols or for drawing attention to faulty packaging. In the sales department, they will have application in connection with charts and production programmes. In view of the fact that they are always ready to hand for use without liquid adhesive, water and label moistener or a heatseal device, nothing quite so convenient has so far been formulated in labelling practice.

Tacky Label Dispensers.—There are several varieties of label dispensers on the market and both hand-operated and semi-automatic types will give first class service and speedy assistance. Other types of labellers provide a means of continuous automatic label dispensing from reel make up. The unique design of the dispensing head in some instances enables labels to be applied directly at the dispensing edge without the usual 'taking away' movement. A heater element may be incorporated to assist dispensing of large labels or to assist general dispensing during cold weather. A speed controller on other types of labelling machines regulates label flow. With a little experience, the operator becomes speedy and efficient.

Liquid Adhesive and Plain Paper

Suitable types of plain (ungummed or coated) basic paper, cut, punched out and printed as labels are applied to various surfaces by means of a suitable liquid adhesive. Liquid adhesive, in conjunction with some kind of paper, is employed in processes of labelling, more so in the case of bulk

merchandise packing rather than individual unit packaging of the article or package. In the application of the plain label, there are a wide variety of papers and a comprehensive range of adhesives which may be applied by hand or by semi-automatic and fully automatic machine methods. Paper is not strong in itself and often tears easily so that it does not require adhesives with high strength. Special paper adhesives are made for use in conjunction with label work of this kind.

Most paper adhesives are derived from vegetable sources but the term vegetable adhesive could, in actual fact, also include a wide range of adhesives in the field of rubber latices and celluloses, but, in the main, the term is generally accepted within the meaning of all those materials which start off as a starch or as water-soluble resins, i.e. pure gum arabic. Starch based vegetable adhesives may be considered by far the most important of adhesives used in conjunction with paper and could well represent some 75 per cent of the bulk of the adhesive generally used in packaging and allied operations. They are soluble in water while they may be varied chemically to an enormous degree so that adhesives from them may be tailor-made to suit a wide variety of paper labelling processes. It is well to remember that starch itself may be bracketed in the low price range of commodities.

The starches most commonly used in the process of adhesive manufacture are derived from potato and maize. A preliminary step is the dextrinizing process, which means the breaking down of the starch molecule by a roasting process when dry, usually carried out in the presence of hydrochloric acid. The process has two main forms: in the first process, the dextrine is left white and is in a condition short of solubility in cold water. In the second, the process is continued until the dextrine is completely cold water soluble, by which time it is light amber to brownish in colour. The degree of dextrinization is dependent upon the time, temperature and the percentage of acid employed in the process and it is the degree of dextrinization which controls the viscosity of the resulting adhesive. Ranges of both white and yellow dextrines varying somewhat widely in viscosity are available to the adhesive manufacturer and they are the basis of most paper adhesives currently used. An examination of the very wide range of paper adhesives based on dextrine will disclose that the water content ranges from some 30 per cent to 70 per cent and this factor more than any other influences the finished product. The primary consideration, that of costs, requires that the more water an adhesive will carry, the better. Certain alkalis, such as borax, will increase the amount of water which may be added to a dextrine solution by causing the solution to 'set' at a lower concentration. This 'setting' point may be taken as the stage at which the adhesive becomes sufficiently strong to hold together two surfaces such as paper which it has to bond. This process, however, has its limits, since the more water in an adhesive, the greater will be the expansion of the paper to which it is applied, and this leads to wrinkling, creasing and sometimes the warping of the paper as the applied adhesive dries out.

Dextrine used in the manufacture of gummed label papers is normally used at a high solid concentration because the

speed of production is limited by the necessity of drying out nearly all the water before the process is completed. Other chemicals are added to dextrines with a view to improving their working properties. Among these additives are sugars such as glucose which keeps the natural moisture content higher and so keeps the film flexible as it dries. This allows a dextrine based adhesive to be successfully applied to tinplate in the process of can or tin and canister labelling.

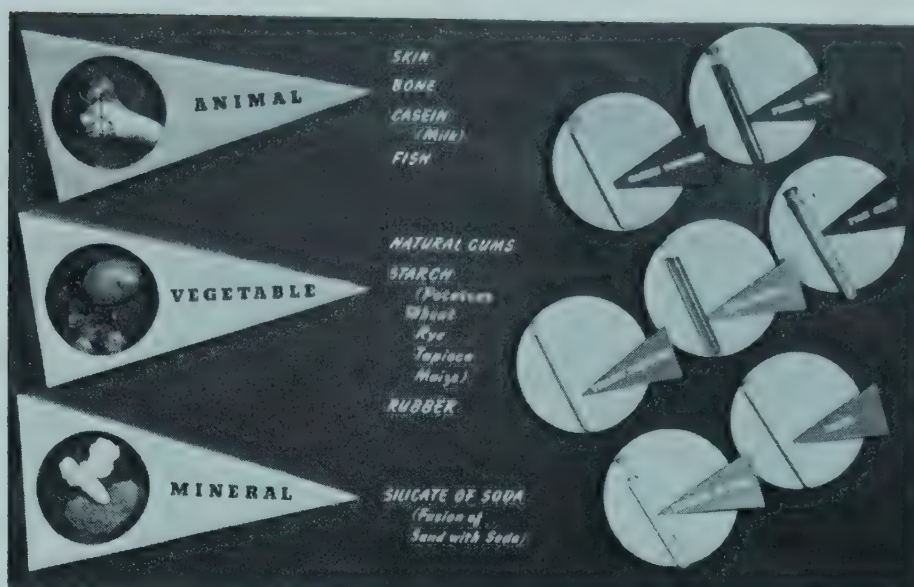
Among the field of natural gums, pure gum arabic is the only type used as a paper adhesive. It is an exudation from the acacia tree and it is readily soluble in water, to produce a free flowing pale mucilage at 40 per cent concentration in water. When properly preserved, it retains its viscosity indefinitely and is therefore widely used as a paper adhesive for many bonding and adhesive purposes. Among its many important applications is that when applied to paper in the sheet or reel for the purpose of gummed label paper making. Its pale colour and freedom from taste makes it the ideal form of adhesive for such items as postage stamps. Where absolute purity in labelling processes are demanded, and this can apply in processes of food and bottle labelling, pure gum arabic should be employed either as liquid or in the form of a label paper.

Label Applications.—Plain label paper as used in various forms of labelling, coding, branding or marking, in conjunction with a liquid adhesive is the oldest method of labelling, the process being merely the hand, semi-automatic or fully automatic covering of a sheet of paper with a thin film of adhesive. The adhesive coated label paper is then ready for immediate application to surface or article. The hand method refers to the application of the wet label and in this process various methods are used to apply the thin coating of adhesive on to base paper. There is, for example, a glueing-out board and here the adhesive is brushed on to the board until it is a thin liquid film and the plain label is then 'flopped' on to the board and removed immediately, taking up on its surface a portion of the liquid glue. An advancement on this process is the Craddy tray, an open metal tray filled with liquid adhesive on which floats a wooden frame across which is stretched an open cloth. The liquid adhesive penetrates through the cloth and leaves on it a thin film and it is on to this film that the plain label paper is dropped. The Craddy tray eliminates the brushing operation of the glueing-out board. Small two-roller sheet gumming machines are also used and there is a further method in which a continuous belt is coated with adhesive so that it always presents a liquid film of glue to the labeller.

Bottle Labelling

The normal adhesives for hand methods of application are flour pastes, or alkaline dextrine mucilages of relatively low solid contents. In the process of semi-automatic labelling which is a more interesting process, one example may be cited, that is the bottle labelling process. In the popular type of machine, the adhesive is poured into a shallow trough in which a smaller roller is revolving. A movable roller then rolls along two flat plates about an inch wide and an inch or so apart to which a coating of adhesive is applied.

Basic adhesives for coating gummed label paper and for use with plain paper.



The stack of plain labels is very lightly held in position in a hopper with the plain side downwards. The two plates are moved upwards to contact the bottom label of the stack and the strength of the liquid adhesive pulls the bottom label away from the stack and down on to the surface of the bottle held horizontally beneath it. The plates separate sideways and felt covered arms rub the label down the bottle firmly into position. The standard adhesive is a concentrated yellow dextrine paste which has to have two properties. Firstly, it must not thread. Should it do so, it soon covers the machine in a spider's web pattern of thin threads. Secondly, it has to have sufficient internal strength, when liquid, in order to pull the label out of the hopper. The production of a bottle labelling adhesive for automatic labelling processes is a matter of some careful processing in order to arrive at a condition which assures perfect working on the machine. The adhesion, however, presents no problem as all water-based adhesives will stick to glass.

Tin Labelling

Some complications can arise in automatic processes of tin or can labelling and tin adhesives, such as casein emulsion pastes and casein rubber latex pastes, are adequate for nearly all plain and lacquered tinfoil, but they have not got the mechanical properties, when liquid, to operate on such a machine. They have very little tack or internal strength when liquid and will not pull the label out of the hopper. In cases where manufacturers decide to change over from bottles to round tins for their packaging processes, with the intention of using the same automatic machinery, it has been found that no adhesive was available which both operates on the machine and sticks adequately to the tin. Adhesive manufacturers, however, have now solved this important 'sticky' problem by making certain additions to the dextrine pastes.

In all processes of labelling, the ideal aim is a flat label to surface without wrinkles or creases. Experienced label operators, in the main, make a first class job, even by hand methods, but certain factors have to be studied at the onset. The ability of paper to stretch when it is moistened or even placed in damp air soon becomes apparent to users. At the same time, this stretch when moistened is not at all regular.

It does not occur equally in all directions of the paper label and this is particularly so in the case of paper made on the paper making machine. Very few hand-made papers are used for labelling processes.

In the process of paper making, the 'stuff' or raw material from which the final sheet is made, consists of fibres, among other constituents. The greater number of these fibres flow along the paper machine wire bed in the long direction or machine way. These fibres are hygroscopic in character, many have a canal running along their centre. This canal, present in the finished sheet of paper cut up as a label, absorbs moisture according to the relative humidity of the surrounding air in which the paper is stored or used. An example would be, say at 55 per cent relative humidity, a normal paper has some 6 per cent moisture present. This will mean in actual practice that a sheet of paper exposed to varying atmospheres will expand or contract about five times more across the paper machine direction than along it. Therefore, when a liquid adhesive is applied to a paper label, it expands and normally curls. If sufficient time can be allowed before the application of the label to permit the paper to reach its full or nearly full expansion ratio, no further expansion can take place after application, and the subsequent shrinkage pulls the label quite flat to the surface of the can or bottle to which it is applied. This, however, is rarely possible, and it is therefore considered advisable (particularly where large labels are used) to cut a rectangular shaped label so that the shortest edge is across the direction of the paper machine. In this way, the direction of greater expansion is limited.

Wherever plain paper and liquid adhesive are used in labelling processes, field tests should always take place with cut samples of varying types of paper in order to ensure that the best materials are chosen and used for the process. In the case of certain types of food processing and packaging, the subject of smell and odour have to be considered. The question of moistureproof or moisture-vapour-proof qualities are important further considerations. While many liquid adhesives are reserved, they should not be held in stock for long periods—some three to four months should be the maximum storage time. Powder adhesives are not so prone to deterioration, but bags should be kept clean and

dry. All special protective containers or packages which are moistureproof should be used as storage until the adhesive is required for use. Old deliveries should be used before new supplies. Cans should not be left uncovered as hard crusts may form on the surface of liquid adhesives. The wide variety of container sizes now available from the adhesive manufacturer permits the users to order in small to medium supplies as may be required over a short period of usage. In requisitioning adhesive supplies, material should be obtained as near ready for use as is possible. Errors in quantities of water to be added is a common failing among many operators and faults are not revealed until the adhesive passes on to the machine when trouble is soon brought to light.

All problems should always be brought to the notice of the adhesive maker or supplier, as some adjustment to recipe or make up may be advised. Only the user will know of his own problems and these are always soluable. With the ever increasing quantities of all kinds of adhesives used in packaging units and packing foods and beverages of all kinds in bulk form, much can depend upon the cleanliness and good functioning of the adhesive in its many applications of sealing, labelling, branding, bonding, laminating or forms of closure. Full regard is now paid to the importance of the appeal and presentation of the packaged product by the consumer, but not the least the adhesive manufacturer who regards package sealing security and high class product presentation as vital to his own development.

Raw Materials

All three kingdoms—animal, vegetable and mineral—are to be found in current adhesive manufacture. Generally, adhesives are not made from pure substances only, modifying agents are added in the form of plasticizers, extenders-tackifiers, driers and so forth according to the type of raw material used and naturally the ultimate form of adhesive application and usage. It is often the use of the modifying agents which really makes a particular formula successful. Here is an outline of adhesive groups and their applications.

Animal Glues. (a) Skin and Bone Glues.—These are often referred to as animal glues and have quite characteristic properties. As their name implies, they are derived from hides and bones of animals. The process is highly elaborate and high quality materials and good yield are obtained only if there is careful control throughout. The top grade animal glues are commercially known as gelatines and used either for edible or technical purposes, such as the manufacture of photographic plates. Bone glues provide the bulk of the packaging adhesives in this field, and probably the biggest single outlet is for the manufacture of gummed tape which requires a good quality glue to provide the quick and permanent stick required of this material.

From the packaging point of view, animal glues offer many of the desirable qualities of a good adhesive, i.e. great strength, free flowing consistency commensurate with rapid sealing and affinity for a big variety of surfaces. Among its disadvantages must be numbered difficulty of preparation

as it has to be used hot and maintained at a constant temperature during use.

Animal Glues. (b) Casein.—This is precipitated from milk and all supplies are imported to this country. It is imported as a white or off white powder and has long been popular as a waterproof glue for the wood working trade although there are signs that it is being superseded by some of the newer synthetic materials.

Due to the scarcity and high price in post war years, many of its uses have been transferred to the dextrine and starch adhesives, and it is doubtful whether a lot of users will revert to casein even if and when times revert to normal.

(c) Fish glues are obtained from the offal and skins of fish. They have a few well defined uses mainly as a ready made domestic adhesive. The characteristic odour is somewhat objectionable and prevents its use for many packaging problems for which it otherwise would be suitable.

Vegetable Glues. (a) Natural Gums.—These are mainly the exudations of a number of trees, the best known and most widely used being that of the acacia, known as gum arabic. Other qualities, again with limited uses are karaya, Niger and Senegal.

Gum arabic is renowned for its purity and is primarily used for postage stamp and high class label and envelope gumming for tongue remoistening purposes.

Vegetable Glues (b) Starch Adhesives.—The field in this section alone is vast. The most important starches, however, are derived from wheat, rye, tapioca, potato and maize. The pastes made from wheat and rye flour are particularly favoured for bookbinding, wall papering and bagmaking.

Potato and maize starch, when modified by the addition of various chemicals, has many uses, and first class economical adhesives are produced.

Starch is a very interesting substance chemically, and much research work has been done in its relation to the adhesives industry. The starch molecule, which is of complex structure, can be broken down by the addition of heat, and in the presence of catalysts to glucose. Before this ultimate stage is reached, however, it passes through intermediate stages in which products known as dextrines appear. The process is gradual and may be controlled and stopped at any stage according to the type of material required. For example, in the early stages, the characteristics of the original starch are preponderant, and the resulting adhesives have very similar properties: low solubility in cold water, white in colour, high in viscosity, and tending to be thixotropic, that is they break down fairly easily under beating action. As the process continues, so solubility increases, the colour darkens towards yellow, the viscosity reduces and the tendency to break down lessens.

An almost unlimited variety of properties can be developed by the process and the dextrines form the basis of innumerable applications.

Commercial dextrines are known as white, canary and yellow broadly denoting high, medium and low viscosity.

Tapioca, potato and maize are the most widely used for dextrinising, and from the adhesives manufacturers point of view, produce adhesives of quality in that order. Tapioca dextrine which in pre-war days gave us top quality glues is still not available for commercial production due to difficulties in the Dutch East Indies. However, potato starches of good quality are being produced, and it is true to say that despite difficulties, machine adhesives of a very high standard are being made. The job of the adhesives maker is to produce a mix to perform particular operations, and to do this, he may blend a number of dextrines of different types to give a desired result. From the packaging angle, the dextrine adhesives create the most interest. They give a strong and permanent bond, have high initial tack for mass production, withstand the action of fast machine operation, and allow of many methods of application.

Rubber and Rubber Latex.—Rubber is used extensively particularly in latex form for adhesive making. It can be compounded with other materials, principally casein, and there are a number of proprietary brands available which are in wide use. They make a flexible bond which is advantageous in some cases. Latex, particularly with a high rubber content, is fast setting, and can be used for self-sealing which seems to be gaining popularity for some bag closing operations.

Rubber adhesives are generally the most expensive of the vegetable group and some limit on their uses is imposed on this score.

Mineral. Sodium Silicate.—This is the chief material in this group, and the only one worthy of note from the packaging angle. It is produced by the fusion of caustic soda and sand giving an adhesive which is strong with quick drying and good water-proofing properties. It is also cheap to produce and economical in use. Its main disadvantage lies in the fact that it is intensely alkaline, and so affects coloured papers and materials. A big variety of silicates are available, some of which are more suited to some applications than others. The ratio of soda and sand determines the ultimate type, and, of course, the greater the proportion of soda, the more alkaline the adhesive becomes.

The manufacture of containers and corrugated board calls for large quantities, and it is also a firm favourite for sealing container flaps. Like most of the other raw materials sodium silicate can be modified by the addition of other materials, and can be extended with china clay and other fillers.

Great care should be taken when adding other ingredients to silicate, as in some cases chemical reaction sets in and the resultant product has properties different from any other of the original materials.

Synthetic Adhesives.—The recent development of synthetic materials, referred to particularly as plastics, has opened up a vast new field for adhesives.

To a very large extent, the development of adhesives of this type goes hand in hand with the increased and now universal acceptance of plastic materials as part of modern



First place in the Cellon Award for the best silk screened transfer, produced by Trapinex.

civilization. Very often in fact, we hear of our present times described as the 'Plastic Age' marking an historical stage as the 'Iron Age' or the 'Stone Age'. This seems to convey that this newcomer may be likely to supplant the older materials made from natural products. Moulded plastics have already been shown to have limitations and the same thing applies to synthetic adhesives. Many of the synthetic materials are still too new as yet to have had their potentialities fully explored, but there is no doubt that in some ways, they have already become firmly established.

Just as there is no universal natural glue, so the synthetic adhesives are many and varied. The materials to be bonded and the purpose for which the fixing is taking place, necessarily influence the final choice of adhesive. Synthetic adhesives divide themselves into two main groups which denote physical rather than chemical distinction.

(a) Thermosetting—types which when in their cured or finished form cannot be re-softened by heat.

(b) Thermoplastic—types which can be re-softened by heat.

The first mentioned class includes phenol formaldehyde and urea formaldehyde which had a great bearing recently on the plywood and wood working industries. These resins do more than just unite the surface, but give strength, durability and resistance to the finished product.

From the packaging point of view, the thermoplastic types are of most interest. The most developed so far are the cellulose esters, vinyl derivatives and chlorinated rubber compounds.

The advent of these newer adhesives will be found to form the foundation on which to base much of the future progress in specialist packaging.

In the production of wet strength papers, the addition of

urea formaldehyde to the furnish in making Kraft and other wrapping papers has provided the packaging industry with a very useful material. Paper bags, shipping case liners can now be manufactured for use for exposure to moisture, and for holding moisture laden contents and still retain their original strength. There will undoubtedly be big developments in this field when the supply position improves.

The putting of special coated surfaces on base papers for decorative and utilitarian purposes already constitutes a big industry in this country, but some of the new coatings are already opening up avenues which indicate their use in much wider fields. Moistureproof and moisture-vapour-proof coatings are being developed and are already having a big effect on tropical packing and we expect them to improve the keeping quality of goods even in the home market.

In the over-coating of labels, some of the adhesives not only render the bond of the label to its base waterproof, but also offer protection to the printed label.

Some of the new films which have been developed for improved packaging are of such light weight that they require to be reinforced, and this is done by laminating with other film paper or cloth. This requires highly specialized adhesives to form a strong bond and to ensure that the package maintains its strength during its field life.

The combining of coils, films, papers and cloths depend on the use of the right adhesive. Many of the newer materials offer scope in decoration and utility in the production of bags, wrappings and containers. Their proper development will be dependent absolutely on the production of the right types of adhesives to allow them full play. Not only must the adhesive perform the necessary bond, but it must not have an adverse effect on the materials. Where materials are made to withstand difficult conditions, the adhesive must do the same.

Heat sealing is being developed on a large scale both in this country and the United States, and this advance has been largely due to the introduction of the thermoplastic resin adhesives. This method of adhesion is likely to make great strides in the near future, and must offer to the packaging industry big possibilities for better and faster production.

Some of the special coatings are in themselves thermoplastic and some incorporate moisture and moisture-vapour-proof properties as well.

Very often the coating medium only allows heat sealing to its own surface and when other surfaces are involved or where the sealing strength of the coating requires reinforcing, special adhesives must be used.

Packaging machinery manufacturers are becoming very interested in heat sealing for wrapping, cartoning and labelling. Many special heatfix adhesives are already available for them.

According to the type of seal required, the adhesive can either be applied as an all over coat or as a spot or stencil coat. It can also be applied, dried and resealed on the packaging machine.

The characteristics of a good heat sealing material should be as follows:

1. It must have an affinity for the surface or surfaces to which it is applied.
2. It should have a melting point at a temperature which does not have a destructive effect upon other materials such as paper with which it will come into contact.
3. It must permit of easy and economical application.
4. In its original application, it must allow of rapid setting.
5. It must be non-blocking at normal storage temperatures.
6. It must be of such a type that when being heat sealed, it will permit of fast production.

Although some of the synthetic adhesives incorporate special properties which are an advance on the natural products, many of them suffer disadvantages in use. Very often they can only be brought into solution with costly, inflammable solvents.

However, emulsions of some of the synthetic resins have been produced in recent years with very satisfactory results but are costly compared with similar products made from natural raw materials.

At this stage it is not possible to say with any certainty which of the new synthetic materials will have a permanent place in the adhesives range. At present, some of the claims for their uses appear to be over-optimistic, but a number of them will undoubtedly stay and find limited and specialized uses leaving the general field still to be catered for by the natural products.

Operating Conditions

1. If the surfaces involved are likely to present any difficulty, samples of the materials should be available.
2. Method of application—hand or machine.
3. If a standard machine, give the name. The adhesives manufacturer will probably have had experience of its operation previously.
4. If not a standard machine, indicate the type of application—roller, transfer roller, stencil, etc.
5. Time interval, i.e. the time between application of the adhesive and the combining of the surfaces.
6. Are the surfaces held under pressure after combining; if so, for how long?
7. Drying method.

Adhesive Machine Application

There is always a special grade most suitable to the machine and the process and machinery manufacturers or adhesive suppliers will always advise and make recommendations in the case of the new process or where problems arise. Special qualities may always be made to meet particular machine requirements.

Bag Making

Popular machines such as the Beasley French, Cobden Chadwick have specially styled adhesives ready formulated for labelling and sealing seam processes, as is also the case with the Holweg and similar machines making up the popular filmic bags. Carrier bags, tea style bags and the S.O.S. type bags are made up from special adhesive recipe.

There are adhesives too, for hand-work which is often carried out in the make up of waterproof paper bags and carriers of good quality.

Bottle Labelling

Automatic machines such as the Banks, Bratby, Matthew Wylie, Purdy Turret and Rotary and the Rose operate well with specially formulated adhesive recipes the makers of which are often recommended by the machinery specialist. The same applies to semi-automatic processes of bottle labelling where such machines as the Autorex, Anker, Ermold, Flowers, Newman, Purdy and the Pony Labelrite machines are concerned.

Cardboard Box Making

Every phase of box making is amply catered for in the supply of first class adhesives. Any adhesive required for processes involving glueing out (hand work), the Craddy tray, topping and banding, both tight and loose wrapping, some topping, setting up, tube winding, spiral processes, and carton making on such machines as the Ritchie, Staude, and the International are always readily available to the box maker. Carton sealing operations undertaken with adhesive on such machines as the Rose and the Hesser are amply catered for while container sealing both by hand and by automatic process on such machines as the Rose, British Standard, the Kanepack and the Ceka, have specially formulated recipes which work successfully. Drum labelling is yet another adhesive operation which may be listed under recommendations for a trade usage.

Packing Adhesives

In the food industries, automatic packing machines figure largely in packaging operations and some well known machines for this work are the Rose Bros., Job Day, and the Hesser popularly used for dealing with chocolate, sugar and cereals packaging among other food products. Sealite recipes are used for flour, sugar, cereals packaging and for bag sealing by hand methods.

Tin Labelling Adhesives

There are a wide range of tin labelling adhesives which work trouble-free on the machine and such work as lap pasting, panel labelling and all hand work is now carried out without any problem. In every case, the adhesives suppliers or maker gives full working and mixing instructions with each individual formula and generally describes the colour, concentration, drying out qualities, odour or flavour-free properties, working speeds, non-warping qualities, non-threading properties, tack and running qualities and re-moistening qualities where each make-up recipe applies. Adhesives are indeed a very wide and even interesting subject and only a glimpse into their make up and application can be given here, but, the packager should always seek advice which is readily available. Modern laboratories now exist where the established adhesive manufacturer is constantly improving qualities and undertaking experiments into new applications or users problems.

Storage of Adhesives

All adhesives should be stored and used observing the following conditions:

1. Cleanliness. Most adhesives, particularly those manufactured from animal and vegetable matter, are subject to the growth of micro-organisms. The best branded adhesives are fully preserved for a good shelf life under normal conditions, but it is important that glue pots, pans, brushes, etc., be maintained in absolutely clean condition. New adhesive should not be added to old in a glue tray or mixing tanks. This is most important when carrying out tests with a new grade.
2. Opened drums or tins should be kept free from dirt and dust. When glue is taken from the drums, care should be taken to see that dried-out adhesive is removed from the sides of the container.
3. Where fully removable lids are fitted, they should be replaced so that the adhesive does not dry out excessively. It is preferable to place a wet cloth over the mouth of the drum and place the lid on as firmly as possible afterwards. This helps to keep the glue in a moist condition. When taps are fitted for easily flowing liquid glues, they should be kept clean and should be thoroughly cleaned out before being fitted to new barrels.
4. Animal glues should be stored in their original packages while not in use. The best grades of flexible glues are wrapped in special moisture-proof paper so that they are maintained in the prime of condition. Packages should be securely closed when parts of a slab only are required for immediate use.
5. Animal glues in jelly form should not be stored where they are exposed to a high temperature.
6. All liquid glues made from an aqueous base should not be stored at low temperatures.
7. All powder adhesives stored in sacks should be raised from the floor—preferably on skids or boards.
8. Liquid adhesives, particularly the emulsion type, should be well stirred before use.
9. Never mix two adhesives to form a compounded grade without knowing all about the raw materials of each quality. This practice rarely provides any improvement and often has disastrous effects.
10. Unlike good wine, adhesives do not improve with age and users should be discouraged from holding stocks beyond about three months.

Swing Labels—Tie-on Tags

High class food products, particularly those styled and designed as presentation and gift packages or units, sometimes carry a swing label which may be some form of greetings, guarantee of purity or a label branding the product. They have far greater application in other forms of industrial packaging, but they do have a use and application in the food and beverage industries. The fancy printed and decorative type of casket, china and earthenware jars, shaped containers are some examples of packaging

containers which may be additionally labelled with a swing label. There is a comparatively new vogue to add seasonal and greetings seals, cameos, tags and shaped labels to the luxury product in particular, and there are many types of well-produced printed swing labels of delicate shape and colour with either special or standard printing which may be obtained from the label specialist. Special styles may be made to specification, most are complete with tassel, cord or some form of tie-on.

Materials used in this form of label make are manilla, light brown or coloured, where great strength is required, while metal lined gold or aluminium board, chromo or art coated board is used for the colour, printed type of tie-on or swing label.

Vitreous Enamelled Labelling

This form of labelling is growing in popularity, particularly in the soft drinks trade. There have been considerable developments in this field of permanent labelling which possesses certain advantages over other methods of label application. At present the comparison of the high class paper based label applied to wines and spirits as compared with the vitreous type still holds its own and progress needs to be made in certain directions with silk screen produced labels.

The outstanding advantages of this brand mark or label applied by printing machinery to glass are that the label is absolutely straight and not crinkled, remaining fast to surface; labelling machinery is obviated; there is no need to

re-label returned empties, and vexatious clogging of bottle washing machines is non-existent. There is no doubt that with constant study by the specialist the vitreous silk screen printed label will become more comparable with other forms of labelling in time.

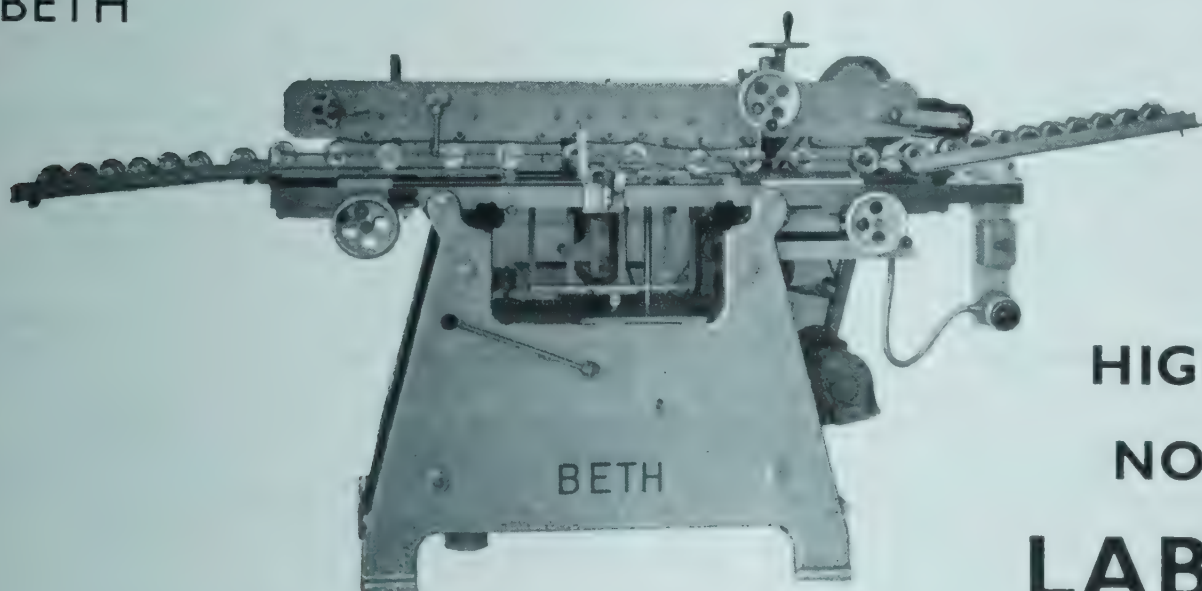
Developments in Packaging

An entirely new automatic machine has been produced in the United States which forms plastic into sheets and then into packages of various kinds, sealing them without any type of adhesive or application of heat or pressure. This machine was recently demonstrated at the Packaging Machinery Manufacturers Institute.

It is claimed that this machine cold-folds and locks unscored die-cut plastic blanks into trays at speeds of 40 to 100 per minute the out-put having relation to the size of package produced. The machine incorporates a cold-folding principle as the medium of confining plastic sheeting during the process of folding, allowing it to resume stability after the package is locked.

The plastic material used is a semi-rigid type of transparent oriented styrene sheets, inexpensive in price range with outstanding qualities such as toughness and dimensional stability. Furthermore, the sheet may be printed by all the everyday standard processes of printing. The machine may be worked singly as a unit or geared up to the production line with automatic filling and wrapping equipment thus making a high speed fully automatic rigid packaging system.

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CHAPTER 4

Films, Fancy Wrappings, Signature Papers, Trade Wrappings, Automatic Wrapping Machinery

THE impact upon the food and beverage trade of all kinds of filmic cellulose transparent wrappings in all its forms, plain and printed, colourless and coloured, has been enormous. The public have come to appreciate the appeal of the visible package where the contents may be seen and yet kept clean, dustproof and fully protected. Current forms of visible packaging of so many foodstuffs and beverages have received a tremendous impetus as a result of the super-market and the self-service stores where products may be seen and chosen without the aid of retail selling. As a result of this appeal, the various manufacturers of transparent wrappings have developed all kinds of films with varying capabilities which enable them virtually to meet every food packaging requirement. The technical difficulties at first encountered made it necessary for considerable research and development work and problems concerning filmic convenience, sealing techniques, and the duration of packaged shelf life have all been studied and solved. One maker cites the prepackaging of sliced bacon as a typical example where, in order to produce an acceptable consumer package, it was found desirable to chill the sides of bacon before slicing and packaging, while at no time was the final package held in deep freeze chambers, as drastic changes of temperature would have had a deleterious effect. The correct amount of vacuum drawn, the heatsealing temperatures and the storage of consumer packs away from ultra violet light are some factors which need to be very seriously considered and controlled. Furthermore, it has been established that food products packaged for the purpose of prolonging shelf life and flavour, may only be preserved under correct food store conditions. This important point has to be fully appreciated by the retailer and more enlightenment on storage problems may be necessary. The packaging of table poultry has been a revelation in film usage and the consumer has now come to accept this form of packaging in preference to the older methods of poultry presentation. Once a seasonal trade, it is now possible to prepare birds, wrap them in transparent wrappings by various processes and when packaged, deep freeze them. Such packaged poultry may be stored away for long periods to meet seasonal and week end rush trade.

Many types of films and ancillary materials have been developed specially for the food and beverage trades and many examples of outstanding filmic development may be given. Of special importance for the poultry packaging industry was the need for a film which, in addition to holding a vacuum, would shrink tightly to the shape of the bird,

thus avoiding the undesirable formation of small air pockets which prevent even freezing of the packaged poultry. With current methods of freezing, there was a need to develop special printing inks capable of withstanding the very low temperatures to which the packaged poultry are subjected. These requirements have been met.

Another example of film development may be cited in the special quality of wrapping required for pre-packaging natural cheese. While a waxed film may prove very suitable for a consumer package, such would not necessarily be the best method to employ when prepackaging large wheels of cheese. For the wrapping of fresh foodstuffs such as meat, fish, fruit or vegetables, rather different qualities of film are necessary and in some cases, it may be found desirable to use a carton or waxed tray presentation with a suitable film over-wrap. These instances are noted here in order to emphasize how important it is to know the film and also to realize its limitations and special properties.

A new vogue in multi-unit selling makes use of transparent material for package make up. Dual or multi-unit selling has become part of merchandizing food and allied products. In this case, two or more products, often differing in character, may be taped together and dropped into a polythene bag which, when fastened with a simple tie or twist, makes an attractive sales unit. Samplings of un-cartoned products are also simplified by the use of polythene bags. An example of this form of packaging is the breakfast cereal and in this case, the product is seen, protected, hermetically sealed, and identified by printed matter. More expensive printed cartons for such purposes are not needed and costs are thus saved.

The major uses of transparent wrappings in the food and allied trades are for bakery products, poultry, tea, coffee, vegetables, meat, bottle wrappings, and over-wraps among other items. The chemical composition of the transparent sheeting has an influence upon its use and advice should be taken to establish the best film for any particular purpose. The use of the right film will save time, trouble and costs.

Packaging Biscuits

First class packaging assists in the initial appeal of the biscuit pack and visibility coupled with first class branding and labelling counts for much. New types of Cellophane, to mention one of the outstanding grades of filmic wrapping, have been perfected for the purpose of biscuit packaging. The packaging of biscuits needs special care and like other

hygroscopic products, they must be fully protected against moisture if they are to retain their crisp factory freshness while on display in the store and in the home. The fat content calls for an effective greaseproof packaging material, and biscuits must be protected from physical damage, a most important factor in these days of self-service where products may have to undergo considerable handling. The characteristic texture of biscuits may have an abrasive effect and so diminish the protective properties of the packaging materials employed. Large scale packaging projects demand a material with an efficient performance on a wide range of fully automatic wrapping machines now in popular usage.

A quality known as MXXT 400/35 is a new type of Cellophane that combines the necessary qualities outlined more closely than any other packaging material. It is claimed that its superiority as a biscuit packaging material is derived from a special copolymer coating applied in the form of an aqueous dispersion. It is the result of many years' research and development by the makers. Gauge for gauge, this film is said to be the most moisture-proof film made in the world. Moreover, this quality is not adversely affected by heat-sealing, creasing or abrasion. It is highly flexible and it is specially plasticized for biscuit packaging. This quality has an improved resistance to grease and fats and has excellent dimensional stability which ensures a wrap that will not shrink or wrinkle. It also has an exceptional surface brilliance, and it gives the biscuits something of an eye-appealing sparkle. It is, in common with high grade films, completely transparent, and has strength and ease of running on various types of wrapping machinery. Biscuits that are wholly covered, e.g. chocolate fingers, do not require such a high degree of moisture protection and may be wrapped in a highly permeable or non-moistureproof film.

Some notes of packaging and storage conditions for packaged biscuits may be useful as they should be at room temperatures consistent with an effective closure. The film discussed above requires a higher heatsealing temperature than standard moistureproof cellulose film, viz. 175° to 180°C. (347° to 356°F.) with a time dwell of three to five seconds and pressure of 20 lb. per square inch. Storage is best in a relative humidity of approximately 40 per cent. It is claimed that the exceptional moistureproofness of this grade of film enables economies to be made on outer containers for transport and long-term storage. If cellulose film other than this grade is used for wrapping biscuits to be placed in airtight tins, the relative humidity of the film prior to wrapping should be 40 to 45 per cent.

Cellulose Films

Cellulose films are used in several attractive ways and some popular methods are briefly outlined.

Direct Wrap.—This is a simple yet effective pack and may be made up on either automatic or semi-automatic packaging machinery, either with heatsealed longitudinal and end-folds or interlocking longitudinal fold with coated thermoplastic

heatfix labels used as a brand label seal or cover to seal in the ends of the pack.

If plain (unprinted film) is employed in the project, a printed paper sleeve, a band or label is usually placed round the biscuits before the overwrapping process with film.

Snack and Fractional Packs.—This type of pack has become popular in bars, public houses and for the picnic and the 'elevenses'. The snack pack may be made up with or without an interlocking fold by fully automatic machines and semi-automatic and automatic pleat wrappers. The fractional pack is popular for after-supper snacks. Made up in two $\frac{1}{4}$ lb. units, each unit is wrapped directly in film and then overwrapped in another film with some type of tear strip attachment for ease of opening. The outer film is removed and each unit may be used as is required.

Trays and Window Cartons.—The rigid tray is now a popular unit for biscuit packaging affording protection and surface visibility for the product. Overwrapped in film, they make a first class pack which may be easily made up on standard carton wrapping machinery. Fragile biscuits are fully protected in this way and any unnecessary compressions are prevented. Any crumbs, should they fall into the tray base, are not seen and therefore do not spoil the finished appearance of the package. This form of packaging is used for high quality biscuits, cookies and other assorted items. The window carton has also become very popular and is a similar type of packaging unit combining visibility of the product and physical protection. The great dimensional stability of branded films prevents wrinkling of the film itself and any distortion of the actual carton. The high surface brilliance of films as outlined also combines with the application of a printed vegetable parchment and affords an appealing pack, the product being fully protected.

Filmic Bags.—This subject is dealt with elsewhere but a brief reference may be made here to the increasing popularity of the viscose bag, plain or printed, in its various shapes for the purpose of packaging all kinds of food and allied products. Biscuits, for example, package well in suitably



Cartons with visible windows.

printed filmic bags so that plain panels are left, enabling the contents to be seen. Bags are quickly filled and a crimp seal closure or a printed paper header heatsealed label is all that is necessary to form a moistureproof closure for the bag. Some of the most outstanding food and biscuit film packs make use of converted films, that is printed sheets or rolls and printed or plain bags. Some firms have become specialist printers and are producing first class colour work for the food packager. Machinery now available for wrapping biscuits and allied products comprises equipment from the simplest hand wrapping project to the large full scale packaging operation. Such machines as the B.C.L. wrapping aid, the Douglas P.8 pleater, Autowrappers WLL machine, the Forgrove No. 4 machine, the SIG type GBBS machines and the Forster HSU2/SW are some examples of current biscuit packaging machinery and equipment in common usage.

The Film Packaging of Groceries.—The term 'groceries' covers a wide range of food and allied products which are the basis of the housewife's weekly shopping list. Their sale is very large business for the food packager much of which has and may be further developed by attractive eye appealing forms of packaging, such as containers, bags, cartons with windows and similar packs. Cellulose films are ideal for the purpose of affording protection and displaying enclosed food products to the very best advantage and there are various types of film designed for specific purposes, and which may be easily adapted to a variety of packaging techniques.

Films, while superficially alike, have important differences which will determine their use. The following recommended series of Cellophane grades will no doubt prove of value to packers of groceries.

MSAT—Moistureproof, water-resistant heatsealing film. This grade is widely used where protection against the loss or absorption of moisture is essential and where heat seal closures are employed. Typical uses include packaging of cereals, dehydrated foodstuffs, table jellies, baking powder, raisins and currants and for the purpose of overwrapping cartons.

QSAT—Heatsealable and water resistant, this grade is much more permeable to moisture than the above-mentioned grade. It may be used where the retention of moisture is undesirable or unnecessary but where heat sealed closures are required as is the case for packaging macaroni products, dried pulses, rice, sago, tapioca and semolina.

PT—A non-moistureproof grade of film used for general hygienic wrapping of products which do not need protection against moisture. Closures are made by liquid adhesive, cellulose tape, plain or printed, gummed or thermoplastic heatfix labels, wire strips or clips, fasteners and by making use of the shrinkage of the film on drying out.

Coloured films are available in both moistureproof and non-moistureproof grades and are made in several colours including amber, tango, green, pink, red, blue, and chocolate. The use of a coloured film, plain or printed, makes a striking decorative wrap and the use of two colours—say amber and tango—may be used to give protection against the harmful effects of ultra-violet light.

MXXT—Copolymer-coated cellulose film. This is one of two new Cellophane films, designed to meet new and stringent conditions. This film is very highly moistureproof and has improved dimensional stability and sparkling surface brilliance, an important feature in current methods of display and self-service selling. It is heatsealing but at a higher temperature than for MSAT. It is also highly resistant to fats, oils and solvents and to the passage of gases and odours, especially under moist conditions. It may be used when exceptional moisture protection is vital to the packaged product, particularly for hygroscopic and/or abrasive items such as biscuits, shelled nuts and dehydrated vegetables. It may, in certain circumstances, replace double wraps and double-walled bags of standard moistureproof films. Polythene-coated cellulose film is another new film and combines the properties of two well-proven packaging materials. They are moistureproof, waterproof and heat-sealing. These types of films are recommended for gas and vacuum packaging and for the purpose of packaging quick-frozen foods and hygroscopic and odorous products.

The selection of the grade of film to be used is important and the various properties must be balanced against the nature of the product itself and the conditions under which it is to be handled, packaged, stored and displayed. For example, although standard moistureproof film MSAT will prove quite satisfactory for most purposes, the added moisture protection of copolymer-coated and polythene-coated cellulose films may sometimes be worthy of consideration and trial. At the same time, if perishable provisions, such as bacon and fresh cheese are not stored and displayed at cool temperatures, a fairly permeable film such as QSAT should be used. Advice and testing sheets may always be obtained from the normal supplier of packaging materials of this type.

The following brief outline of packaging notes will give some small idea of the versatility of viscose film and may perhaps suggest ways in which other products in the food industry may be packaged and displayed, fully protected from dust, moisture and direct handling, while always appearing at their brightest and best.

Gusseted and Double Walled Bags.—This popular style of food packaging has so many applications that it may appear under many headings, the bags being made of foil laminate, paper, waxed material and film among other basic material. For many staple grocery items, such bags are the most suitable vehicle. Bags are made in all kinds of styles—there are flat bags for packaging small quantities of fairly light products such as mint, cloves, herbs, bay leaves and so forth. Gusseted bags are used for the standard weights of pulses, dried fruits and cereals. Double walled bags may be necessary for heavier weights such as flour. Various types of biscuits are put up loose in tins. For more effective display, consumer convenience, hygienic protection and to save time at the point of sale, they may be prepacked in moistureproof film bags. Colour printed bags—and there are many charming examples today—assist in highlighting food products on display, ensure product identification and help to establish a brand name or quality. For the occasional

product, and less costly items, prepacked by the retailer, stock sizes of unprinted bags are readily available. Film bags may be printed to specification with a window design which permits of a transparent area left for the purpose of product inspection. Unprinted or plain viscose bags may be used in conjunction with a header label as already described and this method affords the maximum of product visibility.

Bag Closures.—There are various methods of bag closure, all of which are first class forms of enclosing and the choice may have a reference to the product or the materials used.

(a) Heatsealing. This process of seam or end bag or package closure is only possible where a heatsealing type of film is being used for the wrapping. Heatsealing may also be carried out with thermoplastic labels. The bag may be handled individually and sealed with a foot or hand operated crimp sealer. For long runs, there are several semi-automatic bag sealers through which the filled bag passes on a moving band.

(b) Cellulose self-adhesive or pressure-sensitive tape. Made in white, colourless and coloured, this material is stocked in many widths and may be used plain or printed to specification in as many as four colours with packager's name and brand mark. Here, the top of the bag is folded down and secured with a short strip of cellulose tape. Coloured tapes assist in coding and printed tape is brand promotion.

(c) Wire strip fastener. A strip of wire which may be covered with coloured film or paper, is folded down with the top of the bag and the ends bent inwards. For a really decorative closure, the wire strip is folded tightly round the neck of the bag and the film delicately flared out.

(d) Printed header bag labels. A form of bag sealing giving prominence to the product and the manufacturer, the headers are printed both top and bottom so that when folded over the mouth of the bag, the printed label is seen either side. They may be used with advantage therefore, on unprinted bags. Thermoplastic coated paper headers may be heatsealed to the top of the bag by hand or other methods using heat and pressure. Yet another method of bag closure is the staple and this may be used for the ungummed or plain printed header label.

Bagging Aids.—For the purpose of bagging products in the retail shop or store, a range of inexpensive equipment is available which assists in cutting down time in packaging operations. The use of a weighing machine with a pivoted pan enables the contents to be poured straight into a filmic bag. A funnel should be used for clean filling. There is also a wide range of stapling devices designed to be used to form the bag closure. Multi-headed staplers handle several bags at one time. The use of self adhesive pressure-sensitive tapes, plain or printed, form a first class form of bag closure. Tapes may be dispensed from taping machines which will cut off the required length of tape ready for application. The dispensers now available deal equally well with paper, cellulose or PVC used on the neck of the bag.



Double Gloucester and Stilton cheese vacuum packed by The Lerner Vac-U-Seal machine, the machine heat-seals the open end withdrawing the air at the same time. The pack is then labelled with thermoplastic labels by means of a hand heat sealer.

Cheese Packaging.—Natural cheeses such as Cheddar, Cheshire and Danish Blue may be wrapped along the following lines. A tight wrap is required to exclude as much air as possible, for moisture protection to prevent loss of weight, and to ensure a cool temperature to minimize risk of mould growth. Where packaging is centralized and the package life of a product may be prolonged for more than a few days, a vacuum pack is desirable. A polythene-coated Cellophane is recommended. When prepackaging for immediate sale, a heatsealed wrap should be used and MSAT 300 proves suitable for such purposes if cool display cabinets are available, otherwise, a more permeable film should be used. Hand wrapping may be done on the B.C.L. bias-wrap and sealing aid which is an inexpensive and portable wrapping device, developed specially for the needs of the food retailer. Using a cut square of sheet film simply apply a bias-wrap to the pre-cut portion of cheese which is placed on the corner of the film. It is better to wrap from a stack of sheets kept in a tray which has one side partly cut away for ease of sheet movement. The various types of machinery used for such purposes are simple to operate and may be used without any difficulty after an initial trial.

The prepackaging of bacon in sliced form and cooked meats by the grocer and self-service stores is another merchandizing need as it ensures protection for the product and the highest standard of hygiene both while the goods are on display and while they may be handled. Time is saved both from the standpoint of the packager and the ultimate customer. Here again, the basic hand-wrapping method is to use a heatsealing film either MSAT or QSAT types, as already mentioned, according to storage and display conditions. The B.C.L. bias-wrap and sealing aid, fitted with its special wrapping platform, can again be used.

The portion of sliced bacon is suitably wrapped and heatsealed being wrapped by the envelope method, i.e. the bacon being placed centrally on the sheet and the corners being neatly brought together to form an envelope flap ready for sealing by heat or self-adhesive label giving details of quality, weight and price.

Butter Packs.—Various kinds of film may be used in connection with wrapping butter to make an attractive package. To highlight a special grade of butter, film may be used as a direct wrapping, as an overwrap in conjunction with a suitably printed vegetable parchment or as a protective covering and 'display window' on blocks of decorated dairy butter. Protection against the possible loss of weight may be ensured by the use of a suitable moistureproof film but where the shelf life of the packaged product is short and the butter is kept at low temperatures a non-moistureproof film may be used. In the process of wrapping butter the film should be folded firmly and in this way no sealing is needed in order to keep the pack in position.

Filmic Meat Wrapping.—A special type of Cellophane is used for packaging fresh meat and quality MSADT 300 is generally recommended for such purposes. This and similar grades have a moistureproof, water-resistant coating on one side only. The film may be heatsealed, but full seal strength is only obtained by sealing two coated surfaces together. Such films reduce drying-out, and, if properly used, will prevent discoloration of the meat itself for some time. Experiments have shown that wrapped meats in suitable film may be displayed at a temperature of 30° to 34°F., the meat retaining its bright red colour for about 72 hours. Such films as outlined above must always be used with the uncoated (non-moistureproof) side in contact with the meat. To identify the uncoated side, fold over a corner of a sheet of film, sliding the inner surfaces against each other; if they slide easily they are coated, if sliding is difficult the uncoated side is within the fold. When delivered the sheets in each packet will all be the same way up, so it is only necessary to test one sheet from each packet.

For bacon, ham, luncheon meats and similar items, the choice of film will again depend upon conditions of storage, display and volume of sale. Ideally the film should always prevent excessive drying out and should at the same time be heat-sealing. When the meat is prepackaged in the store for immediate sale and can be stored and displayed at cool temperatures say 33° to 40°F. or 0° to 5°C., a standard moistureproof film such as MSAT may be used. If cool temperatures are not possible, it will be advisable to use QSAT 300 which is a more permeable film. Both of these grades may be sealed by the application of heat; they are coated on both sides and may be used with either side in contact with the packaged meat. Where a package life of more than a few days is required, e.g. with centralized packaging for a number of shops, a vacuum pack (as in the case of cheese) may be desirable. For this purpose, the use of film bags made from polythene-coated types of film is recommended. This important new technique is at present in the early stages of development but special packaging problems are being studied by the specialists. In particular, the vacuum-packaging of ham and luncheon meats calls for special care.

Fresh Sausages.—Since the composition and keeping qualities of sausages vary, no hard and fast rule relative to the use of film type is possible. It has been found that a



A well-known pack labelled and secured in cellulose film.

highly permeable film such as QSAT or PT is preferred by the majority of manufacturers. Sometimes, however, highly permeable films may cause excessive drying out and consequent discoloration and in such cases, a standard moistureproof film has proved satisfactory. To ensure that the type of film best suited to the product is used, tests should be carried out before one is finally selected for commercial usage. Due regard must be paid to conditions of distribution, sale or storage. Skinless sausages should be packed on a card base, in a shallow carton or U-shaped tray and the wrapping operation so arranged that those who directly handle the package do not touch the film itself, otherwise the film may become soiled with grease and so render the heatsealing operation more difficult; at the same time, the whole package may be soiled and thus spoil other packages which come into contact at any stage of display or sale.

Light Check.—Processed meats may discolour because of oxidization, a change accelerated by exposure to light. For meat which cuts up into small slices a cardboard base with an outside label covering the heatsealed folds can be displayed uppermost. This will limit the cut surfaces that are exposed. The product will be visible through the transparent sides and base, but this type of pack must be efficiently displayed or replaced after consumer examination. Generally speaking, limiting the exposure of the meat at all stages plus suitable lighting in the display cabinet are the best precautions. To reduce the effects of light, especially on processed meats, the light intensity at the surface of the meat should not exceed 25 ft. candles. Ham, which is more liable to discolour than some other cooked meats, requires a light intensity of not more than 15 ft. candles. Packs of processed meat not on display should be stored in darkness until required for replenishing a display cabinet prepackaging must be based on the estimated sales from a display cabinet. Smooth working calls for buffer stocks of unwrapped and wrapped meat, ready to be moved to the next stage in the journey from cold storage to the display cabinet. The ideal aim is to keep cabinets well stocked with as many different types of meat and sizes of pack as is possible; time and patience is thus saved. Most films are cut to standard



A group of printed viscose bags for poultry packaging, and a packaged bird, sealed, labelled with weight and price ready for display and sale.

sizes of 8 in. x 8 in., 10 in. x 10 in., 12 in. x 12 in., 15 in. x 15 in. and 18 in. x 18 in. which cover the majority of packaging operations. Special sizes may be cut as required and rolls are also available. Rolled film may be used for wrapping medium to large size products. In addition, films may be supplied in plain or printed sleeves, bags, wallets of all kinds and details of these may be obtained from the usual packaging materials supplier.

Labelling.—Chapter 3 deals with the various mediums of product labelling but here, some reference may be made to the labelling of meat and allied products. External labelling is usually carried out by either pressure-sensitive, self-adhesive or thermoplastic heatfix labels. The latter are often heatsealed directly on the film wrap but there is some danger of scorching the meat as a result. Scorching may be avoided by using Delatac or delayed action heatfix labels which are heated away from the package and applied when tacky, such a label remaining tacky for some time after the source of heat has been removed. Labels of all kinds are invariably printed to specification with design, trade mark or trading slogan. There are also standard stock labels which carry price, detail, weight and space for quality for the purpose of overprinting or stamping. Labels should always be bright, colourful but not too large so that they obscure full vision of the enclosed packed product. Labels placed in a similar position on all packages help to establish a brand name or quality. The mass display of the product must be taken into account when considering the position of the label. Where a product looks attractive in mass display formation, the top right hand corner of a tray pack is by far the best for both unit and mass display arrangement.

Poultry Packaging.—This is a rapidly growing packaging field and film is used in all forms, plain, printed, sheet and bag, all of which afford a first class medium for presenting fresh poultry for the table. In this case, a transparent, flexible hygienic film with a high permeability to moisture is essential. Moistureproof films may cause mould or slime formation QSAT Cellophane gives high permeability to moisture and is heatsealing and water resistant. PT grade is non-moistureproof and is not heatsealing and in this case, paper labels, cellulose sealing tape or wire strip fasteners must be used as the form of closure. For quick frozen poultry, a moistureproof film is used to reduce weight loss and to prevent desiccation which may cause freezer burn and discoloration. The pack should be completely sealed, the bird snugly fitting inside the wrap—low temperature flexibility is also needed. B.C.L. polythene film is recommended and this is a moistureproof, heatsealing, waterproof, and is inherently flexible at low temperatures. Polythene coated film also combines the properties of cellulose and polythene films and is recommended for gas and vacuum packaging processes.

Fresh Fish Wrapping.—In this field of packaging and wrapping, a material which will protect and display the fish and prevent it from coming in direct contact with other products, is essential. The film must be a good moisture and odour barrier and provide an efficient heat seal. The type of film generally recommended for this purpose is of the MSAT 300 type which is moistureproof and water-resistant. It is also heatsealing, odourproof and highly transparent and flexible. In certain conditions, condensation may appear on the inside of the wrapping but this will not harm the

contents but it may be generally unacceptable on the grounds of appearance. In this case, a more permeable film may be preferred. Thermoplastic labels are used for sealing and enclosing, preferably on the outside of the pack. These labels should be of the delayed action type which can be heated away from the product so that there is no danger of scorching the fish. Several labels may be prepared at once and used as required as they remain tacky for some time. Metal foil labels are often used as they afford a large measure of eye appeal for the packaged product. Often two labels are applied, one being the brand label and the other the overprinted identity label which gives price and weight details. Trays overwrapped in film are suitable for a very wide range of individual fresh fish packaging projects. By the use of varying sized trays, the finished pack can be made up with sufficient portions for one, two, three or four 'servings'. Standard sized sheets are also available for individual packaging and this prevents waste of material and produces a neat and uniform package.

B.C.L. bias-wrap and sealing aids are also available for wet fish packaging, and for automatic overwrapping of trays with heat sealing types of film such machines as those made by Baker Perkins Ltd., and Rose Brothers are specially suitable for the work.

Packaging Pointers.—Before wrapping on a large scale, tests should be carried out to determine which film and method of pack best suits individual needs. Only top-quality birds should be packaged. The state of the bird immediately before it is killed and immediately afterwards will affect the length of time it will remain in good condition. Poultry should be chilled as soon as possible after plucking and kept spotlessly clean before being wrapped. They may otherwise become tainted. Eviscerated poultry has a shorter life than uneviscerated unless kept at suitable cool temperature. For maximum shelf life, fresh poultry should be stored and displayed at 33°—40°F. (0°—5°C.). At normal temperatures, packs of eviscerated poultry should be ventilated, either by partial closure or perforation to maintain freshness—about four to six perforations, a quarter of an inch in diameter should be sufficient. The giblets can be wrapped in a sheet of film and placed inside the bird before the whole is wrapped. Wraps for quick-frozen birds should not be perforated as a complete closure is essential to maintain moisture protection. Quick frozen poultry should be stored at a temperature not exceeding 0°F. (—18°C.) prior to display in suitable cabinets.

Methods of Packaging.—The method adopted will depend upon the volume of birds to be sent to market or distributed and there are many excellent mechanized processes available for the large poultry packager. Whole birds in medium to small quantities may be direct wrapped and a simple jig will hold a bird firmly in position for the purpose. Jigs may be adjusted to enable birds of varying sizes to be packaged. In addition to sheet wrapping B.C.L. polythene tubular film, among other grades, is used for neat and speedy packaging. The bird is placed in a tube of suitable length and width.

The two ends are sealed by heat, tied in a knot or secured with cellulose self-adhesive tape, wire strip fastener or plastic clip. Bags of filmic material, plain or printed, are also popular mediums for packaging. The use of a simple former assists in opening the bag ready for filling. In order to produce a neat package, one end of an elastic band should be looped (outside the bag) over the 'parson's nose', and cross banded underneath the bird, the other end being brought over and round the trussed legs. Cut up portions of poultry are best packaged in suitable trays film wrapped for complete protection. Dispenser trays are available for this purpose.

Fresh Produce Packaging.—The prepackaging of fresh produce presents growers, wholesalers and retailers with a big opportunity for expansion of business and by adapting well-tried techniques designed for each individual purpose and trade need, many new types of fresh produce may be visibly and hygienically packaged. Cellulose film, polythene film and cellulose acetate film may be used for packaging fruit and vegetables. With the combined aid of the fibreboard corrugated packing cases, now specially designed for such purposes, full protection is accorded to the product coupled with the saving of weight, freightage and handling costs.

The successful packaging of fresh fruit and vegetables depends upon the application of a few golden rules, such as the nature of the product, the suitability of the available packaging materials and the conditions under which the produce is likely to be distributed, displayed and sold. Since fruit and vegetables are perishable and their various keeping periods differ widely, these basic principles are bound to overlap to some extent when put into practice. The relative importance to be attached to each will depend upon local packaging and marketing conditions. Only the best grade produce should be packaged as one faulty item may spoil a whole pack and thus impair the brand or the name of the packager. Perishable foods that are prepacked must remain at least partly visible so that customers can see the product. The clearest types of film should be used. Here are some further points to be considered:

1. Many kinds of fruits and vegetables are protected by nature with a rind or skin, but produce must be fully protected where sold under conditions of self-service and self-selection where fruits and vegetables must be proof against dust and handling by the shopper.
2. Fruits and vegetables contain a high proportion of moisture, the loss of which must be slowed down to ensure maximum freshness and prevent the loss of weight. The relative needs for moisture protection of produce items covers a wide range and there is a suitable variety of filmic wrappings designed to meet it.
3. Fruit and vegetables continue to breathe after picking and the chosen wrapping material must permit the passage of oxygen and carbon dioxide. Gas requirements of individual items differs and in some cases the film used may have to be perforated or the pack ventilated in some other way, for example, by means of an incomplete closure. Pack ventilation will also avoid 'off-odours'.

4. Products must be protected both while in transit and in store so that they display well and aid consumer choice. The basic strength and flexibility of cellulose acetate and polythene can be combined with more rigid materials and containers where extra protection against bruising is needed.

5. In order that the maximum freshness at the time of sale is maintained, most prepackaged produce should be stored and displayed at cool temperatures. Low temperatures, however, slow down the rate of 'breathing'. It has been estimated that a temperature drop of 10° cuts the breathing rate of most items by half. The efficient use of refrigeration will cover every aspect of marketing, pre-cooling before packaging, refrigeration during storage and transit, and cool display cabinets at the point of sale.

6. Condensation may appear on the inside of packaged produce. It can vary with temperature rise and fall but it will not harm the contents. It may be regarded by some as a sign of freshness. As a rule, the non-moistureproof and highly permeable films show the least condensation. Package ventilation and the avoidance of wide fluctuations in temperature will also assist. Ideally, visible condensation can be avoided by ensuring that the temperature of the product when packed is lower than that during subsequent storage and display or by avoiding exposure to direct sunlight.

7. Printed film may be used as a medium for branding the produce in the same way as many other products in the food and beverage trades. Brand names have established themselves in the fruit produce field and the consumer comes to recognize and ask for this or that brand as a result of printed film or applied label. The gummed label used for the banana is an example of first class fruit brand labelling.

Some Suggested Films for Fruit Packaging.—There is no one special packaging film available for the purpose of uniform wrapping or enclosing every kind of fruit or vegetable as each film has a function to perform and the following brief survey of grades may therefore assist packers.

MSAT moistureproof, water-resistant and heatsealing film is available in three gauges, 300, 400 and 600. It is used in sheet and roll form for direct wraps and overwrapping of trays, cartons and boxes. It is also available in bags where specific quantities or weight of produce may be enclosed.

MSADT is a less moistureproof quality than the above grade but has a water resistant coating on one side only. The uncoated side is placed next to the product. It may be heatsealed but maximum seal strength is only obtained when the coated surfaces are placed together. The 300 gauge is the only one available and is used in the main for a direct wrap.

QSAT combines high permeability with heat sealing and water resistant qualities and is made only in 300 gauge. It may be used where items packaged do not need a standard moistureproof film, for which heatsealed closure is required. It is also used as a direct wrap for cartons and trays and is made up into bag form.

PT is a non-moistureproof, waterproof quality, the package being sealed by adhesive tape, staples or wire fasteners. It is used for direct wraps and partial wrap where hygienic

protection is the main factor. It is used in the form of bands and covers on fruit punnets.

Polythene film is a tough, moistureproof, waterproof, heatsealing and gas permeable film and is supplied in sheets, rolls or tubular form. It is popular for fruit produce and is mainly used in bag form. Made in several gauges from 120 (0.0012 in.) and upwards.

Impregnated Fruit Wrappings.—Considerable quantities of various types of fruits such as oranges and lemons are imported into this country in bulk form and although often stored for limited periods, little evidence is now found of decaying fruit likely to impair the contents of packing cases. Considerable attention has been paid in recent years to the use and application of specially impregnated packing case liners, lined cartons, and impregnated wrappers which have been specially formulated to prevent deterioration of fruit in its ripe form. Impregnated wrappers which are quite harmless are now available for fruit packagers and these cover all types of citrus fruits arriving from fruit growing countries which need to be kept in perfect condition during transit or store until point of distribution. Such papers should also be specified by the fruit packer in the case of the British fruit growing industry.

Cellulose Acetate Film.—This is a non-moistureproof, water-resistant film with a fairly high permeability to oxygen and



Fresh produce protected and displayed with Celawrap the acetate breathing wrap.

carbon dioxide. It is used for covering trays, punnets and as a film insert in window cartons. Bags have been made up from this material but have not yet proved themselves for produce packaging.

The usage of all films comprises of direct wraps, bags and overwraps on rigid and semi-rigid containers. Except where the pack is clearly determined by the weight, size and perishability of the produce, there are no hard and fast rules which lead to a particular choice. Choice, however, is dependent upon those who do the packaging, the grower himself, the central packer or the retail distributor, also on the opportunities for automatic wrapping and on the methods of display in the retail shop.

Produce Direct Wraps.—Complete wraps are recommended for large items marketed singly such as cauliflower, cabbage, lettuce and cucumber. A sleeve wrap or band is often used to pack items which require good ventilation such as rhubarb, spring onions, onions, celery, and asparagus. Complete wraps are heatsealed, stapled, and secured with a wire strip fastening or simply twisted at the end. Sleeve wraps are secured with cellulose self-adhesive tape or elastic bands. A special wrap has been developed for apples and this consists of a twist-wrap of cellulose which can be applied by a semi-automatic machine which wraps up to four apples, producing a skin tight wrap. This kind of film should be perforated. The use of a printed film, printed self-adhesive tape, gummed label, or some kind of insert will afford opportunity to publicize brand name and details of the product.

Produce Filmic Bags.—Flat, gusseted and block bottom cellulose bags are also used for fruit packaging although there is some difficulty with soft fruit. Various weights of film are available subject to the bulk and weight of package contents. Heavy weight films are best for root vegetables. The introduction of aids to bag filling in the form of bagging machines have given greater scope to this form of produce packaging. The bag need not completely cover the produce and open neck bags may be used for such items as asparagus, celery and spring onions. Printing has reached a very high standard of perfection and some outstanding colour results may now be achieved by the specialist printer. This aids product recognition at the point of sale.

Polythene v. Polyethylene.—The term 'Polyethylene' was apparently evolved in the U.S.A., from a mistaken impression that the name 'Polythene' was a registered trade name in the U.K. The Packaging Films Manufacturers' Association would like this error to be corrected as it has caused some confusion in the minds of the public, and the polythene film manufacturing members of the Association have now agreed to use the name exclusively. The Association hopes that all connected with the manufacture and distribution of polythene products will do likewise.

Trays and Open Cartons.—There is an increasing vogue to overwrap various types of containers, both rigid and semi-rigid in some kind of suitable viscose film. Where the wrap-

ped container has been printed, a plain film is invariably used, but in the case of the plain carton, a film printed in colour provides the necessary eye appeal and introduction of brand name of the product. The film is so closely applied that it affords additional physical protection for the product and helps to make an easy-to-carry-away package. Most forms of packaging are easily adapted to automatic wrapping techniques. Produce put up in this type of container should be graded very carefully for size in order that packs may be standardized and any movement within the pack itself reduced to an absolute minimum. The range of containers in this field of packaging is wide and includes such popular items as cardboard open top cartons, trays, and boats, moulded fibre trays, open-work plastic trays, vacuum formed plastic punnets, the traditional chip punnets and baskets used for all kinds of soft fruit.

Many of these containers are wrapped in some kind of heatsealing film by hand, semi-automatic or fully automatic methods of closure. In the case of small operations, and for store convenience, the B.C.L. wrapping aid and bias-wrap and sealing aids may be used. Where a complete overwrap is not desirable, a sheet of film is used as a cover and is usually secured by means of an elastic band. This capping operation can now be carried out by semi-automatic equipment. Most fruits and some of the less bulky types of vegetables are packaged in one or other of the containers outlined above. Quite apart from routine packing, these film wrapped containers provide great scope for display and general presentation particularly in the case of stew-packs of prepared mixed fruit and presentation packs of grapes, peaches, for named brands of apples, tomatoes, mushrooms and so forth, graded for quality and of a uniform size. The filmic wrap or, in some cases, the container itself may be printed with all the necessary details of brand, quality, packager's name and trading, slogan.

Methods of Packaging in Film.—Fruits and Vegetables.—The following comprehensive list of types of packs and notes on preparation and handling of fruits and vegetables is reproduced by courtesy of British Cellophane Ltd., and will no doubt prove of considerable value to packagers. (See also pp. 99 and 100). When referring to this guide, the following pointers should be borne in mind.

(a) With highly perishable items such as the softest fruits and products with a high respiration rate, the more permeable films such as QSAT and PT films and cellulose acetate film will usually be more suitable. Where such films are desirable, it will be found that this has been noted in the tables.

(b) Where a moistureproof film is needed MSAT type will be necessary for wraps. For bags, either Cellophane or B.C.L. polythene can be used, polythene is usually preferred for root vegetables and heavier weights. Where no specific film is mentioned in the tables, the choice will usually lie between MSAT-type Cellophane and B.C.L. polythene film.

(c) Cool temperatures during packaging, distribution and display considerably assists in the aim of keeping the produce firm fresh. For many items of produce, particularly those with a high respiration rate, a pack ventilated with

suitably placed holes is very desirable. Such packing case facilities are now available where the product has to breathe and this fact is mentioned where it is of special importance.

(d) With perishable produce of all kinds distributed and sold over a wide area in the country and under somewhat differing conditions it is obviously impossible to lay down hard and fast packaging recommendations that will apply in each and every case. As has been previously pointed out, a good knowledge of various films and what they will do is most important and coupled with suitable basic packaging techniques, prepackagers should carry out tests under field conditions in order to ensure that the best results are obtainable for the produce and from the packaging materials. Assistance is always available from the film specialist.

There is a great deal of machinery now available produced by the packaging specialist, and much of this equipment may be either adapted or specially designed for a need or purpose by arrangement. A full detailed list of manufacturers or suppliers of hand-sealing irons, semi-automatic wrapping machines and wrapping aids, wrapping machines of all kinds, punnet-capping machines, bagging machines, bag-making, filling and sealing machines, sealing tape dispensers, machines for staplers, trays, in fact all equipment necessary for the various processes of packing and packaging, may be obtained by the Produce Prepackaging Development Association Ltd., while other information may be obtained by the specialist in the field of paper and board supplies, adhesives, label papers and so forth. Many of the leading maker's equipment is shown and discussed in this book for the general interest of the packer and packager.

Packaging Progress.—The importance of presenting all kinds of food and beverage products in the best possible light not only assists sales as a result of increased eye appeal, but helps in the maintenance of hygiene in food presentation which is so important. Where exports are concerned, the products of the British packager must be at least equal to the local product or those exported by other countries in open competition. The volume of packaging is increasing annually. From 1955 to 1957, the annual output of produce packs in Britain leapt from 100,000 to over 100,000,000 and the number of packers from five to more than 200. This is in the field of produce packaging alone and is not the whole picture of Britain's development. This is a measure of the impact that prepackaging has made upon the trade distributor and retailer themselves and the public who have now come to accept and expect better forms of all kinds of packaging, not the least, produce packaging. A major merchandizing revolution is taking place. This revolution has created a new industry which has its periodical exhibitions at home and overseas and it becomes obvious to the visitor that all trades, not the least the food and beverage industries, are amply catered for in both wrapping materials and forms of closure and the essential machinery for packaging in both small and large quantities. Opportunity should not be missed to visit a packaging or trade exhibition when it takes place in the near vicinity of the packer or packager.

Bottle Wrapping.—Most bottled products may be made much more eye appealing on display or at the point of sale as a result of being wrapped in a suitable plain or printed cellulose film. This tendency is becoming more and more obvious in the wine and spirit trades where coloured film suitably pleated and sealed assists not only in appeal but in the dustproof and hygienic presentation of the product. A direct wrap of film is most attractive, this form of packaging being known as the 'wet-wrap'. Non-moistureproof film is mainly used and the method of film application varies with the volume of packaging to be carried out. Hand wrapping is a straightforward operation the film being placed on a damp pad with the bottle on top with the label downwards. The film is drawn round the bottle thus forming a sleeve and an overlap seam. The film may then be pleated against the base, the bottle being in an upright position. The film is gathered firmly at the top and pulled taut. A spin of the bottle will form a pig-tail of film on top.

The method of estimating the length of sheet is carried out as follows:

- Length: Overall length of bottle including the cork, plus two-thirds of the diameter of the bottle (to be folded against the base), plus approximately 2 in. according to the size of the bottle—this is for the pigtail twist at the top.
- Breadth: This should be equal to the circumference of the bottle plus approximately 1 in. for the necessary overlap.
- Grain: This is important to the wrapping operation for finished effect and efficiency and should be specified so that it runs the length of the bottle, in other words, the long way of the grain.

Hand Wrapping.—Methods of hand wrapping are simple as described above but obviously no set speed can be laid down as this will depend upon the type or size of bottled product and the efficiency of the operator. The whisky type bottles, for example, are usually wrapped at a speed of between four to seven bottles per minute. The operator soon becomes expert.

Semi-Automatic Machine Methods.—One well-known bottle wrapping machine, 'The Strand', is operated by one person and a wrapping speed of between four to five per minute is achieved.

Fully Automatic Machines.—There are a number of well known wrapping machines designed for bottle closure and the 'Rose' B.C. bottle wrapping machine is one in popular usage. With these an output of some 40 to 60 bottles per minute is easily possible.

It should be noted that the maximum size of bottle is 26 fl. oz. The Verpackungs-Automaten bottle wrapping machine is a continental type of equipment which, according to the makers, is capable of wrapping up to 25 per minute.

METHODS OF PACKAGING FRUITS AND VEGETABLES IN FILM

| Product | Band | Direct wrap | Bag | Over-wrap trays, etc. | Film cover punnets, etc. | Notes on preparation and handling |
|------------------|------|-------------|-----|-----------------------|--------------------------|--|
| Apples | | x | x | x | | Select unbruised fruit. Wipe clean. Uniform size essential for direct wraps and trays. Direct wraps (up to four apples) can be applied by machine, using a twist-wrap technique. Perforate film. |
| Asparagus | x | | x | x | | Pack fresh stalks only. <i>Do not</i> wet stalks, this will hasten decay and cause odours. Use QSAT. Perforate or partially seal bags or complete wraps to ensure ventilation. Pack for quick turnover. |
| Bananas | x | | x | x | | Select ripe fruit. Trim stem. Cool temperatures (below 54°F.) may cause deterioration. |
| Blackberries | | | | | x | Remove damaged and mouldy fruit. Do not pack tightly. $\frac{1}{2}$ -1 lb. maximum. Use QSAT, PT or cellulose acetate. Pack for quick turnover. |
| Blackcurrants | | | x | | x | Not so soft as some fruits. Use QSAT, PT or cellulose acetate. Ventilate bags. |
| Beans (broad) | | | x | x | | Select only undamaged beans. Do not wash. Can be packed in or out of pod. Once removed from pod they have fairly short life and should be packed immediately for quick turnover. |
| Beans (French) | | | x | x | | Pack for quick turnover. |
| Beans (runner) | | | x | x | | Discard diseased beans. Grade for equal size, wash and air-dry. Do not remove stalks. |
| Beetroot | | | x | | | Select for size. Wash carefully and air-dry. <i>N.B.</i> Cooked beetroot needs highly permeable film (QSAT, PT or cellulose acetate), and should be handled with special care to avoid damaging the softened skin. |
| Broccoli | | | x | x | | Clean, trim stalks and open buds. If washed, dry well before packing. |
| Brussels Sprouts | | | x | x | | Select only fresh, firm sprouts. Trim and wash. |
| Cabbage | | x | x | | | Trim butt. Remove discoloured or excess leaves. Ventilation of pack ensures circulation of air and prevents discolouration. Cabbage heads can be cut in half and direct wrapped. |
| Carrots | | | x | x | | Grade for quality and uniform size and shape. Trip tops and wash. For prepared carrots: peel, cutting out black spots; then dice and slice. Use polythene film bags. Ventilate pack. |
| Cauliflower | | x | x | | | Pack whole heads or cut segments. Trim leaves closely to reveal most of flower. Do not wash. Whole heads should be clean, white and undamaged. Damaged or over-heads may be used for cutting into segments. |
| Celery | x | x | x | | | Cut to required length, trim butt and damaged leaves. Wash. Use QSAT or PT cellulose film. Ventilation required: film band may be most suitable. |
| Cherries | | | x | | x | Remove damaged, over-ripe and unripe cherries. Leave stalks. Handle carefully to prevent damage to skin. Use QSAT, PT or cellulose acetate. |
| Cranberries | | | | | x | Remove decayed and damaged fruit. Highly perishable. Use QSAT, PT or cellulose acetate. Avoid rapid changes in temperature. Ventilation required. |
| Cucumber | x | x | x | | | Select for shape and colour. Wipe clean. Complete wrap in sheet of film with ends twisted; band wrap secured with cellulose adhesive tape; cellulose film bag may be used for half cucumbers. |
| Damsons | | | x | | x | Select dry, undamaged fruit. Careful handling to prevent damage to bloom. Use QSAT, PT or cellulose acetate to prevent mould. Ventilation required. |
| Endive | | x | x | x | | Trim butt and damaged or discoloured leaves. |
| Gooseberries | | | x | | x | Remove damaged and diseased fruits. Grade for maturity. Avoid moist conditions. Use QSAT, PT or cellulose acetate. Ventilation desirable. |
| Grapefruit | | | x | | | Select only sound fruit. Wipe clean. |
| Grapes | | | | x | | Clip off mouldy, damaged grapes. Keep dry, minimum handling required. Blow off dirt, insects, etc., do not rub. Fairly high respiration rate. Ventilation desirable. |
| Leeks | | x | x | x | | Trim to required length. Should be fairly dry before packing. Use QSAT, PT or cellulose acetate. |
| Lemons | | | x | x | | Select sound fruit. Wipe before packing. |
| Lettuce | | x | x | x | | Remove damaged or discoloured leaves. Trim butt, wash and drain of excess moisture. |
| Melons | | | x | | | Pack singly. Use QSAT or PT. Partial closure will ensure ventilation. |
| Mint | | | x | | | Reject discoloured stalks. Trim to required length and wash. |

THE PACKAGING OF FOOD AND BEVERAGES

| Product | Band | Direct wrap | Bag | Over-wrap trays etc. | Film cover punnets etc. | Notes on preparation and handling |
|---------------------------------|------|-------------|-----|----------------------|-------------------------|---|
| Mushrooms | | | x | x | x | Handle with care to avoid 'spotting'. Keep dry and pack as soon as possible after picking. Brush with very soft brush. Trim stalks and pack only good quality cups and buttons. Very high respiration rate: use QSAT, PT or cellulose acetate and ventilate wrap. Bags can be used for store packaging. |
| Mustard and Cress | | | | | x | Cut evenly. Wash and drain off excess moisture. Use cover of QSAT film. |
| Nectarines | | | x | x | x | Remove damaged fruit. Handle with care. Use QSAT. Ventilation required. |
| Onions (bulb) | | | x | | | Remove sprouting and damaged onions. Use a moistureproof film. Ventilation required. |
| Onions (spring) | x | x | x | | | Remove damaged onions. Wash thoroughly. Trim green tops to even length. Sold by bunch. Ventilation desirable: e.g. by band, leaving tops exposed. One or two loose spring onions can be included in mixed salad packs. |
| Oranges | | | x | x | | Select sound, clean fruit. Grade for size to suit weight or count. Should be dry when packed. One or two oranges can be included in mixed fruit packs. |
| Parsley | | | x | | | Remove damaged leaves and trim stems. Wash. |
| Parsnips | | | x | | | Select firm, crisp and undamaged roots. Grade for size. Wash and dry before packing. Ventilate pack. |
| Peaches | | | | x | | Select sound fruit. Handle with care to avoid bruising. Keep cool and dry. Refrigeration desirable. Use highly permeable cellulose film (QSAT or PT). Pack for quick turn-over. Bags may be used for store pre-packaging. Use coloured shredded cellulose film for decorative nesting. |
| Pears | | | | x | | Select only firm, ripe (but not over-ripe) fruit. Grade for size and uniform ripeness. Handle carefully to avoid bruising. Package for quick turn-over. Use coloured shredded cellulose film for decorative nesting. |
| Peas (in pod) | | | x | x | | Remove decayed pods. Wash and keep cool. High respiration rate. Refrigeration and pack ventilation required. Pack for quick turnover. |
| Peas (shelled) | | | x | | | Shell carefully and sort peas for quality. Do <i>not</i> wash. Pack for quick turnover. |
| Peppers | | | x | x | | Remove peppers with soft spots or other blemish. |
| Plums | | | | x | | Remove damaged plums. Keep dry and handle with care. Highly perishable. Ventilation of pack desirable. |
| Potatoes | | | x | | | Select undamaged and disease-free potatoes. Wash and dry (or dry clean). Grade for size and weigh. Use polythene film bags. Ventilation required. To reduce greening: (a) ensure rapid turnover of packs; (b) keep packs away from bright light; (c) may be desirable to use bags made from tinted polythene film. Pre-packed potatoes must be sold by weight. Minimum net weight must be declared. |
| Radishes | | | x | | | Select only firm and brightly coloured radishes. Wash and cool before packing. |
| Raspberries | | | | | x | Remove damaged and diseased fruit. Pre-cool if possible. Handle with care and pack as soon as possible after picking. Use QSAT, PT or cellulose acetate film. Refrigeration desirable. Pack for quick turnover. |
| Redcurrants | | | | | x | Remove over-ripe, poorly coloured and diseased fruit. Handle with care. Remove leaves but do not strip from stalk. Use QSAT, PT or cellulose acetate. Do not overload pack. Pack for quick turnover. Refrigeration desirable. |
| Rhubarb | x | x | | | | Grade and cut to required length. Remove damaged stalks and trim leaves. Wipe clean. Use QSAT film. |
| Salads | | | x | x | | Select required items, e.g. lettuce, cucumber (short lengths), spring onions, tomato, water-cress, etc., and prepare as described in this guide. Arrange to form attractive display. |
| Shallots | | | x | | | Clean. Peel off dead leaves. Trim tops and roots. |
| Spinach | | | x | x | | Remove damaged and wilted leaves. Wash thoroughly and cool. Trim long stalks. Ventilate pack. |
| Stew Pack (whole vegetables) | | | x | | | Select one (possibly two) of each vegetable. Wash and dry before packing. Swedes, turnips, carrots, onions and parsnips can be used for this pack. |
| Stew Pack (prepared vegetables) | | | | x | | Wash selected vegetables. Slice, dice or shred. Swedes, turnips, carrots, onions, parsnips, leeks, celery, cabbage, etc., can be used. |
| Strawberries | | | | | x | Remove soft and diseased fruit. Handle carefully. Pre-cool if possible. Do not pack too tightly. Pack for quick turnover. |
| Swedes | | | x | | | Remove damaged or decayed swedes. Wash and dry. Trim tops. |
| Tomatoes | | | x | x | | Select only firm, ripe (but not over-ripe) tomatoes. Grade for size. Do not remove calyx. Temperatures below 45°F. may cause premature deterioration. |
| Turnips | | | x | | | Wash. Remove top and root. |
| Watercress | | x | x | x | | Clean. Remove yellow and damaged leaves. Pack when moist. High respiration rate. Ventilate packs. |

Melinex Film.—As is well known, there are many efficient films on the market made and marketed under various trade names and some reference may be made to one of the more recent films. Melinex is the trade name given to polyethylene terephthalate film introduced into this country by the Plastics Division of I.C.I. Ltd. For some years, the only fabricated form of polyethylene terephthalate polymer has been fibre sold in the U.K. under the trade name Terylene, but more recently, attention has been directed to its film forming characteristics, and a considerable amount of work has been carried out on the manufacture and market evaluation of Melinex film. This film is tough, transparent and flexible, with a high surface gloss and has outstanding mechanical strength over a wide range of temperatures. Electrical properties, such as those of volume resistivity and dielectric strength, are excellent and, because of its low water absorption, the film retains these properties at high humidities. Although this film does not fall within the class of low-loss dielectrics, its combination of properties makes it attractive to many industries, in particular to the electrical industry for capacitor and insulation uses, especially at high temperatures. Its properties of very low gas and odour permeability, low water vapour permeability, impermeability to fats and oils and good chemical resistance also make the film potentially attractive to the packaging industry in general. As experience and knowledge become more widespread, so will its potentialities. There are at the moment only limited uses in the food and beverage industries, but drawn uncrystallized film has been used for heat-shrunk packages. For example, dressed poultry packaged in this way can be stored indefinitely at low temperatures, and can also be cooked in the pack. The immediate outlets for Melinex film in the packaging field would appear to be in the form of a laminate and for window cartons. It may be used as an overwrap. It would seem that both amorphous



Diophane cellulose film wrapper introduces the traditional Hovis motif in blue and white, combined with transparency (Transparent Paper Ltd.).



H. S. Whiteside & Co., Ltd. are now marketing their complete range of Sun-Pat nuts in multi-coloured printed Diolam packs (Transparent Paper Ltd.).



Two Diolam biscuit packs for Huntley & Palmer (Transparent Paper Ltd.).

and drawn uncrystallized film are of potential packaging interest, the former to provide a vacuum formed pack and the latter a shrink-tight package. Some progress has already been made on printing this new film and suitable inks are now available. It is claimed that it makes an ideal base for pressure-sensitive tapes of all kinds and can be used for labelling, sealing, enclosing and colour coding purposes.

Diophane and Diolam.—The former being a cellulose film and the latter a laminate, are two well-known films used for filmic bags, wrappings and overwraps among other purposes. Diophane laminate, with its high gloss surface and sandwiched printing ability, is now being used for a very wide range of food packaging products. The visual impact of the sandwiched print is one good example of sales appeal which multi-colour film can have upon the consumer, where it is used for suitable products such as packaged soups and wrapped or bagged items.



Polyflex used for packaging fruits and vegetables.

Polyflex.—This is a new flexible polystyrene film made at an economic price level. Polyflex 150, as it is called, is the latest addition to the range of these orientated polystyrene films produced in the U.S.A. It is made in four gauges in sheets and rolls. It is claimed to be odourless, tasteless, non-toxic with a toughness and a brilliance of clarity which is outstanding. Moisture-vapour and gas transmission rates are said to be low and the film has excellent dimensional stability and ageing characteristics. These properties make the film particularly suitable for the packaging of many kinds of foodstuffs in the form of overwraps, bags, pouches, wrappings and carton box windows. The film can be printed by any of the processes and may be end- or seam-sealed with either adhesives or impulse-type heatsealing equipment. It is already in use in the U.S.A. for food packaging. At home, food containers of various types may be pressure formed from polyflex polystyrene film and used as containers for ice cream, dairy cream, cottage cheese and similar food products. One feature of such containers is the snap-on lid, also pressure formed which is claimed to give a liquid tight seal.

Film and Controlled Ventilation.—Polythene is claimed to cut weight loss in produce and in meat. A perforating process that gives 'controlled' ventilation promises to find new uses for polythene and other films in their application where 'non-breathing' properties have hitherto been limited. The amount of perforation may be predetermined and the resulting permeability of the material to moisture and gases arranged to suit the food or other produce packaged. The material is marketed in reels, sheets and bag form. It is applicable to any flexible plastics film or thin sheeting. Polythene is perforated mechanically with holes that are less than ten-thousandths of an inch in diameter and that appear only as pin-points on the surface of the film. The treatment is said to be first class in effect having little reaction to the strength of the film and no detrimental effect whatsoever on its sealability. The film is normally perforated after printing but the holes do not impair the design. By varying the number of holes punched in a given area of film



An alternative method to the direct wrapping of fresh fruit and vegetables is carton overwrapping in cellulose film. This method lends itself to prepackaging by machinery. (Transparent Paper Ltd.).

the Ventoplas system provides it with a calculated degree of permeability. (This is the name of the company which markets the material).

Polythene that has been given a moisture-vapour transmission rate of about 1,400 grams per square metre in 24 hours has been found for example, to be most successful for packaging fresh meat, while the figure for various types of fruits and vegetables varies between 400 and 800 grams per square metre. The first commercial use of the treated film is as a heat sealed wrapping for sausages. It is credited with reducing the rate of oxidization and consequent discoloration in the product, considerably lengthening its distribution and shelf life. Test shipments of beef from the Argentine to Smithfield Market have been made with this film replacing the usual type of stockinette wrapping. Tests show that the film will keep the meat in good condition and also drastically reduce the loss of saleable weight, due to the moisture loss that is usual during the voyage. The experiments concerned both chilled and frozen beef. The first was with 11 hind-quarters, chilled during shipment; they are placed in large bags of 200 gauge perforated polythene closed by tying at the mouth. Weight loss during the voyage averaged $\frac{1}{2}$ lb. per hindquarter (one-third of one per cent) as against 2 lb. per quarter (1.45 per cent) on the remainder of the shipment which was stockinette wrapped as usual. Other tests are being made. The frozen film wrapped beef is also reported to have been brighter in appearance than when other material is used and to have no sign of freezer burn.

Mushroom Shrinkage.—Tests claimed to have been completed in recent months on the performance of perforated film as a packaging material for mushrooms compared it with cellulose film bags and with cellulose acetate coverings for moulded pulp trays. Tests showed nearly 50 per cent less drying out and shrinkage in the polythene-packed produce.

This perforated method of packaging is being tried out for many other types of produce including poultry and bacon. Shipments of bacon are being sent from Ireland under field test.

Cellulose Film Bags with Tear-Strip Device.—There are several forms of easy open filmic bags used in connection with produce packaging and these open up by various quick devices. In the case of the large polythene bag, many of these are opened up with a zip opener so that the product may be shown at the point of sale and replaced inside the bag. Many types of grocery packs could be tear-strip sealed for ease of consumer opening where small or occasional quantities are required. Among current packs with such facilities are sugar and tea bags. A new tear-strip device which may be incorporated into transparent cellulose film bags in order to enable them to be opened speedily down the face, gusset or seam, has been introduced by Robinson of Bristol. This is known as the 'Kwik-Rip' device, and it permits the bag to be opened either completely or partially as desired. Such types of bags may be used for the occasional dispenser. The device consists of a red strip or black hairline incorporated into the bag in the process of its manufacture. A particular advantage of locating the strip in the seam of the bag is that the film overlaps at this point and in this way, the hole left by the punched-out 'starter' tab is backed by the underlying film to give a sift- or leak-proof and hygienic package. The starter tab may be placed anywhere along the tear line and may be designed to tear in either direction. This device can be of special interest where outer bags for sachets are involved in packaging projects and will also be suitable in one-use packs, for example, meat pies, foodstuffs in general, confectionery and similar products.

'Densothene'.—This is a new polythene film in the high density range and is now available to packagers. Made by the Metal Box Co., this new polythene film has several interesting features compared with low density polythene films in general. It is easier to handle by reason of its greater rigidity and it has lower permeability to gases and moisture vapours and greater resistance to oils and fats. At present, it is rather less transparent than other grades of polythene film and less tear resistant—particularly in one direction. The latter feature could be a positive advantage in some instances, in particular it could foreshadow the introduction of the tear-strip polythene film packs. It can withstand boiling water, and in this direction, it could open up many possibilities for the boilable package.

Hypak Polysealer.—This is a single action, high speed, low cost sealing machine for polythene tubing and bags. This machine is very compact and portable weighing only some 13 lb. It is simple to operate and fast in action. There are no pedals or levers and it provides instant release after sealing. It is adaptable for wall mounting for the sealing of bags containing free flowing materials. It is interesting to note that both hands of the operator are free to control the article being sealed.

Polythene Header Bags.—Packagers and distributors of food and allied products realize the importance of gearing as many items as possible to the self-service methods of selling. A new polythene header bag with a special application in this field of selling has been perfected by John Dickinson, the bag consisting of a polythene coated kraft back and a clear polythene front for displaying the product. The flap is sealed down in order to provide a reinforced top in which a hole is punched so that the bag may be used on a display or self-service type of stand. The bottom of the bag which is left open for filling, may be cut flush, or the polythene front cut shorter than the paper pack. The bag may be heatsealed by any suitable polythene sealer and the contents thus become enclosed in a welded pouch. Up to four colours may be printed on the header or the back of the bag thus affording full advertising facilities to the packager relative to brand, name and trade mark. Development as a result of research into new forms of cellulose filmic wrapping continues and there can be no doubt that one day the perfect all round film will be found to meet the needs of various groups of packagers. To know the film, its possibilities and its limitations, is most important and once again, it cannot be stressed too strongly that tests should always be made with various samples of recommended film where the new packaging project is under consideration.

Transparencies with Inherent or Added Heatsealing Properties

In addition to thermoplastic labels and heatfix adhesives used for sealing and enclosing paper and film packages food and beverage products, there are a group of transparent films with inherent or added heatsealing properties and such wrappings may be directly heatsealed with hot iron, hot plate or by means of some suitable attachment fitted to packaging machinery, working as a heat sealing device. Such materials from which the package itself may be made or films with these added heatsealing properties are films of rubber hydrochloride, polythene, cyclized rubber, and cellulose films, many of which have been outlined in this chapter. Various grades of heatseal papers are set out in the tables of materials on page 104, together with their fundamental qualities and details of their heatsealing qualities. These tables are reproduced by courtesy of the Printing, Packaging and Allied Trades Research Association and should prove of some value to packagers using heatseal materials in their packaging projects.

Fancy Wrappings

This field of packaging and wrapping papers is almost limitless, and includes such specialities used by the food and beverage packager as printed and embossed viscose films of all kinds, Scotch plaid tartan papers used for packaging shortbread biscuits, gold, silver and aluminium metal lined and bronze coated papers embossed, brushed or burnished (mainly used for metal seals, cameos and brand labels for the package) specially embossed signature papers, the design incorporating the packager's name and brand mark in a

PROPERTIES OF SOME HEAT-SEALING MATERIALS USED FOR PACKAGING

| Material | Water Resistance | Water Vapour Resistance | Resistance to Chemicals | | | Inflammability | Odour | Taste | Resistance to ageing | Softening range | Remarks |
|--|------------------|-------------------------|-------------------------|---------|------|----------------|--------|--------|----------------------|--|--|
| | | | Acids | Alkalis | Oil | | | | | | |
| COATINGS Paraffin and micro-crystalline waxes | Good | Good | Good | Good | Fair | Burns | None | None | Fair | Variable (from about 125°F. up) | Strength of seal depends on cohesion of coating to coated material as well as on degree of cohesion between coating and coating. Seal must chill before pressure is released. Strength poor. |
| Asphalt | Good | Good | Fair | Fair | Poor | High | Varies | Varies | Good | Variable | |
| Cellulose nitrate | Fair | Good | Fair | Poor | Good | High | None | None | Poor | | Usually modified with waxes and resins. Normal temperature of heat-sealing about 265°F. Seals fairly easily to give fairly good seals. |
| Cyclized rubber (Pliolite) | Good | Good | Fair | Good | Good | Slight | None | None | Fair | 275°F./350°F. | Only heat sealable if made from natural rubber. |
| COATINGS AND FILMS Polyvinyl Chloride and copolymer | Good | Fair | Good | Good | Good | Burns Slowly | None | None | Good | Dependent on plasticizer | Copolymer heatseals at about 270 F. For short dwells temperature may be as high as 400°F. |
| Polyethylene (Polythene) | Good | Good | Good | Good | Good | Low | None | None | Good | Melts fairly sharply at about 230°F./260°F. depending on grade | Coatings on paper seal normally. Plain film requires special technique. |
| Cellulose acetate | Fair | Fair | Fair | Poor | Fair | Low | None | None | Good | 250°F./350°F. | |
| Polyvinylidene Chloride (Saran) | Good | Very Good | Good | Good | Good | Low | None | None | Good | 240°F./260°F. | Special sealing technique needed. Good seals. |
| FILMS Rubber Hydrochloride (Pliofilm) | Good | Good | Fair | Fair | Good | Low | None | None | Fair | Heat-sealing accomplished between 250° and 350° F. | Good heatsealing properties. Strong and tight seals. |

pattern, printed design and floral fancy papers, seasonal and special occasion gift wrappings, printed box tops and many other varieties of wrappings and box covering papers too numerous to mention, all of which may be examined in fancy paper maker's ranges of samples. Where a limited wrapping operation is concerned, sheets or rolls may be obtained from stockists, but in the case of the medium to large packaging or wrapping operation, special designs are prepared for the sole use of a packager and his products, thus continuously advertising the goods while on display and in the home. Many types of fancy wrappings are included in the list of specialized food and beverage trade wrappings outlined in this chapter.

In spite of the increased use and application of the printed carton and the cellulose printed film used for wrapping round plain cartons, there is still a large field of fancy paper

usage. Most fancy papers paste or line well on to other basic board or card material and in this case, the adhesive must be suitable so that discoloration is avoided.

Whatever the type or style of fancy paper pattern, box-making papers are produced by two main processes, the one as a result of paper coating on to surface in the reel or sometimes in the flat sheet, and the other method is that similar to the manufacture of wallpaper where the patterns are obtained on aniline printing machines capable of printing in several colours with gold and bronze printing facilities. Many fancy papers are also embossed with a pattern of some kind and there are literally hundreds of patterns available. Other types of hand coated fancy papers in the high class range are lacquered with cellulose or some suitable type of varnish in order to render them more durable and finger- and dustproof. The basic papers used



Fancy packaging papers.

must be suitable for lining or pasting down and vary from strong sulphites such as are used for decorative wrappings and box linings to other types of base papers with a wood furnish. Such papers as leathers, suede leathers, calf papers, mother of pearl, and mica embossed fancy papers, are examples of coated, coloured varnished and embossed papers. In the machine produced series of fancy papers, the series and patterns are almost legion and include floral designs, established and contemporary patterns and renderings, decorative and seasonal patterns, bizarre, fancy printed papers of the cheap variety, often imported. In the high class range are handmade mother of pearl, cretonne patterns, fabrics, weaves and woves, thatches and embosses, some of which are used for luxury gift boxes and casket making. Most of these papers are available in flat sheets 20 x 30 in. and 22 x 30 in. and on 20, 22 and 30 in. reels for box lining machine operations and packaging in general.

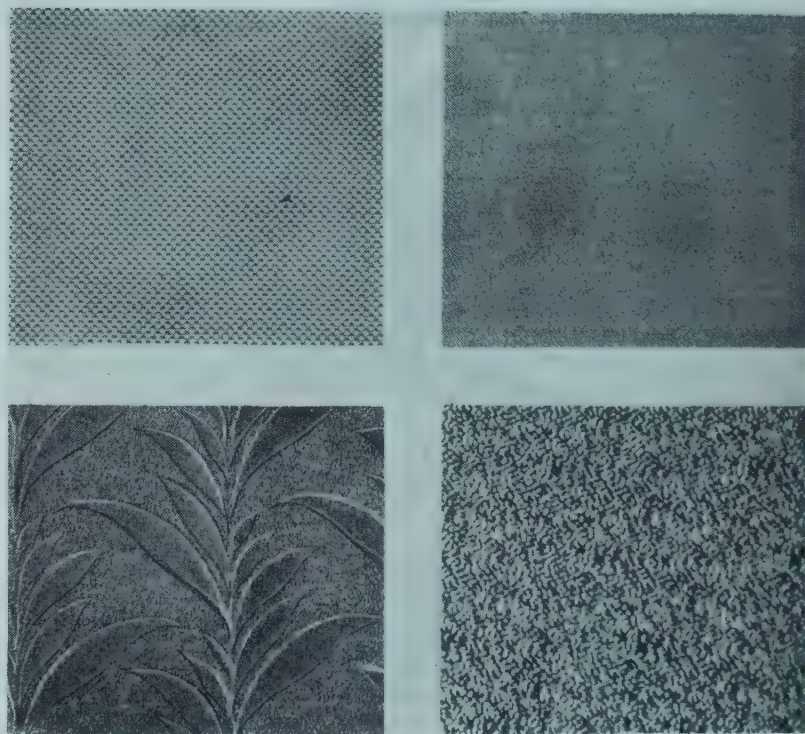
In addition to box making and wrapping, they have applications in exhibition work and display in general as backgrounds for displayed products. Display is now an essential part of marketing the product and many manufacturers and packagers include such items as showcards, showstands and display material with the delivery of goods for retail usage. The modest window may be made to appear quite smart and appealing by the judicious use of suitable fancy papers and showstands and can produce some outstanding results calculated in increased sales of the product.

Gift and Special Occasion Wrappings

At one time, Christmas and Easter were the two sole occasions marked by the use and application of a specially

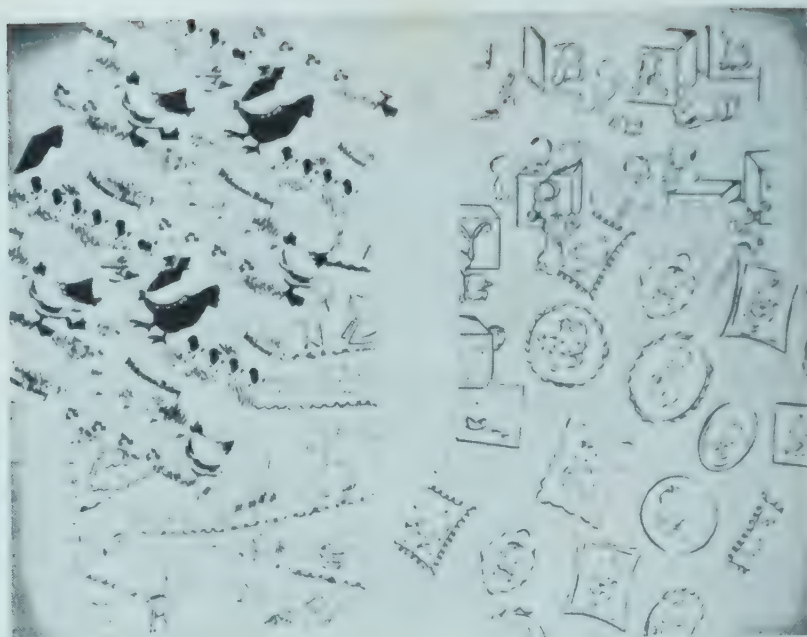


Seasonal fancy printed wrappings.

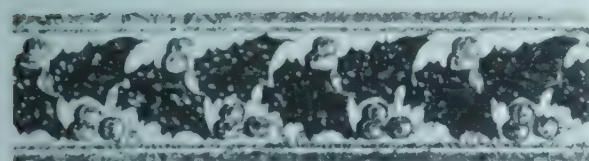


Some current embossing designs.

printed fancy wrapping. The traditional Father Christmas, the holly and the sleigh on the one hand and the egg and the chick on the other, limited the scope of the packager concerned with special occasion packs and gift item packages. Today, the vogue to package gift items in special wrappings for the occasion has spread from the U.S.A. and the continent and the packager may now obtain birthday wrappings, wedding and other celebration papers, Mother's Day and special papers for other festive occasions in the calendar which are just as important in our daily lives as Christmas and Easter. The shopper in search of something suitable for a gift for a birthday or for some other occasion appreciates an attractive looking carton or package suitably wrapped and labelled with greetings tie-on tag or seal ready



American examples of special fancy wrappings (above) suitable for infant foods and products and (left) some special occasion fancy wrappings.



Seasonal fancy printed bands and wrappings for packaging and display.

to address and hand or post to a friend. Products so wrapped look twice as enticing while on display. Unused overwraps may always be removed if not required. Special designs may always be prepared for the specialized packager of gift item produce and the Scotch tartan shortbread wrapping is an outstanding example of the use and application of individual fancy papers.

Signature Fancy Papers

Any type of base paper, metal lined, gold or lemon bronze coated, foil laminate, coated surface or enamel, calf or friction glazed paper may be printed and embossed with a special signature design, a method of fancy paper production now becoming more and more popular in use. The packager's name, trade mark and trading slogan can be artistically arranged into a charming pattern and reproduced in paper, board and other wrapping material used in the process of packaging a group of products. In this way, the whole family of food products can become recognized by the buying public as one of the series.



Some attractive signature papers used for box coverings and packaging.

Fancy paper makers, many of whom specialize in this form of design, are now able to produce some first class designs from the packager's brand names and trade marks, the ultimate design being reproduced in the form of an embossed steel engraved roller from which paper and board in many substances or weights may be suitably embossed with the pattern. The pattern obviously becomes the property of the packager's and is used only on his products. Signature paper may be used directly lined on to carton or box material, in conjunction with tissue and heavier weight wrapping and packaging papers and for lining papers and overwraps. Foil laminates emboss up particularly well and take up the fine engraved pattern outline in full detail.

Kindergarten Fancy Papers

The children often accompany parents to shops and can influence the purse strings. There is nothing so intriguing as a suitable toy or kindergarten fancy wrapping for suitable items and these make first class displays which provide an all round appeal. Suitable patterns are readily available from the normal supplier and the range of designs is usually added to annually. There are some established designs by well known producers and these have an application in the novelty games and toys trades. Overwraps, bands or some form of partial wrap can make all the difference to produce presentation where the food may be purchased with a view to party and special occasion festivities. The patterns in this series are far too numerous to cite but include all the traditional items, such as trumpets, drums, animals, balloons and soldiers all of which can have a use and application in the food and beverage industries. Most of the patterns and designs also carry an embossing which further enhances the printed sheet. They too are available in sheet form and reel for all methods of packing or packaging.

Flock Papers

These beautiful lining, boxmaking and covering papers with their rich plush like surfaces and bright colours, should have an application in specialized packaging projects. They may be best described as something between a textile and a box covering material. The base paper on to which the flock is combined is very strong and may sometimes be a kraft material. The coated surface finish has the appearance of baize, velvet or plush. The flock used for coating may be of wool, cotton, rayon or some other suitable fibrous material, many flock papers being suitably embossed with a pattern to further enhance their finished appeal. The home made flock paper rather resembles a rich velvet or plush pile. It is very durable and may be used where the after use of a container is under consideration. Red, royal blue, purple, green, biscuit are some of the standard colours, the paper being available in sheets 20 x 30 in. and in reel form.

Bag Papers and Liners

Many kinds of films, laminates, foils, fancy papers, and krafts, unglazed and glazed, are used for bag making. It depends whether strength or eye appeal is involved, but some material will afford some of those qualities. Parchments, tissues, and krafts are used as bag liners and these

types of papers help to retain flavour and resist damp penetration. Bag papers and liners may be obtained in all the standard sizes of wrapping papers and on reels. The packager chooses his special type of wrapping in connection with the make up of bags, satchels, wallets and other types of food containers.

A Short Index of Food and Beverage Wrapping Papers

Acid-Free Papers.—These are an established series of papers made free from acid or other constituents likely to have a deleterious effect upon packaged products. Made in various weights and some colours from strong basic materials, they eliminate active acid in the case of certain packaged food-stuffs.

Adhesive Papers.—Special heatsealing and heatfixing thermoplastic adhesive papers have been formulated in recent years for use in labelling, packaging and sealing products in the food industries. Such papers are applied by heat and pressure and have an application in the make-up of some shaped boxes, cartons and packs used in the food trades. Instantaneous and delayed tack are the two chief heat-sealing papers now produced.

Alkali-Proof Papers.—Base paper which has been treated to resist the corrosive action of alkalis or papers that have been suitably treated with colours not affected by alkalis.

Aluminium Foil Laminates.—Thin sheet aluminium foil is now laminated to thin tissue, kraft waxed papers, vegetable parchments, and other materials in order to make them rigid for packaging purposes. Aluminium foil makes an ideal packaging medium as it is fully protective against light penetration, outside attack from moisture, physical damage to packaged products, protection from dust, dirt, grease as in the case of wrapped fatty materials, and many other harmful conditions often encountered in packaged merchandise. It is bright and may be printed and embossed so that the product is readily identified. Current foils are heat-sealable so that they may be safely sealed without the application of moisture which may be undesirable in certain packaging operations. Foils are obtainable in sheet form, on reels of all widths, and in addition they are capable of being folded, lightly scored so that a first class package may be made-up.

Bag and Sack Papers.—Many new types of moisture-proof, fireproof, acid and alkali-proof, waterproof wrappings are now made suitable for use as material for bulk packing all kinds of products, for inner liners in cases, crates, multi-wall paper sacks and bags designed to hold a variety of products. Current wrappings are coated with polythene, impregnated with bitumen, reinforced with glass and sisal fibres thus giving untearable strength to the wrapping. At the other end of the scale, the less expensive and established types of machine glazed and unglazed brown wrappings are used for bag-making and wrapping where everyday bulk merchandise is packed that does not call for any special protective wrap-

ping. Bag liners are also available and in this field such papers as parchments, glassines, transparent materials, and waxed papers are used to afford protection to certain kinds of powders, greasy substances and liquids. These materials help to retain colour and flavour in certain types of packaged products.

Bakelite Papers.—A soft basic paper impregnated with a synthetic and after drying and curing, compressed or laminated at some 1,000 lb. per square inch and a temperature of 300° F. and in this way, the resin coating is made into a Bakelite material used industrially for many purposes.

Base Paper or Board.—Any type of paper base material treated by printing, embossing, graining, coating, impregnating or lining in ply form. Most papers may be treated in one or more of these forms. Base papers may be converted in the flat sheet or on the continuous reel.

Black Line Paper.—A chemically treated paper somewhat similar to a blue print paper, the former producing drawings in black lines on a white ground.

Black Paper or Photo Black.—Used where it is desirable to exclude all light from packaging. Used in some sections of the food industry.

Box Boards.—There are many types of box boards, the highest grade being clay coated and used for high-class carton and box work on a scoring and folded basis. The surface is such that fine colour printing may be produced.

Box Enamels.—The established types of highly glazed clay coated enamel papers used for box-making in the food and allied trades have been augmented in recent months by the new cast coated high gloss papers used for label work, packaging materials and box linings. Box papers and cast coated varieties are made in sheets and reels and they may be printed by letterpress and litho processes. They may be embossed thus forming a high class packaging material. Both of these grades are also coated with dextrine gum or heat-sealing recipe so that they may be used for seals and brand labels with packaged products.

Breaking Strain or Strength.—A form of expressing the tensile strength of wrappings and packaging papers and represents the force exerted or applied by a suitable machine to break a strip of paper under test.

Browns.—A general term for brown wrappings used for bulk wrapping of light weight products for stock or storage. Used in the food industries; there are also grades made for various trade usage. Made in standard sizes and on reels, many grades being made up into bags and wallets of various sizes and shapes.

Butter Papers.—Fine strong opaque wrappings used for packing fatty products. They comprise of genuine vegetable parchments, greaseproofs, both bleached and unbleached. Cleanliness and freedom from odour are important.

Carbolic Paper.—A strong wrapping impregnated with carbolic acid and used for packing goods subject to attack by insects or fungi.

Cellulose Film Wrappings.—There are several grades of colourless and tinted, plain and embossed, viscose filmic wrappings made under various trade names and used for visible packaging. Some are made with inherent heat-sealing qualities present.

Chemical Filter.—Used by analytical chemists and made in two grades.

Chemists' Blue.—Also termed self blue and seidlitz blue. Made both glazed and unglazed in various shades of blue. Best grades are fast to acids.

Cleansing Tissue.—Also termed facial tissue, the best grades are soft yet strong, free from dusting and used for cleansing purposes and general hygiene.

Coated Papers.—Any basic paper or board which is clay coated for colour printing, or a paper treated with an adhesive for label work, or a chromo used in high-class packaging.

Congo Blue.—A filter paper treated with congo blue solution; acids give a blue coloration while alkalis give red.

Cork Paper.—A very coarse basic paper treated with an adhesive recipe and afterwards sprayed with powdered cork. Used for glass bottle packing and cushioning material.

Corrugated Papers.—Many new corrugated wrappings have been formulated in recent years with superior properties, better resiliency, pliability, softness and freedom from harmful adhesives. 'Pillo pak' and 'Flex' are the latest additions to the series of papers.

Counter Roll Holder Papers.—Glazed, unglazed, lined and printed thin to medium brown wrappings are supplied on rolls for use with tear off counter roll holder machines and as such, play their part in small to medium size bulk packaging work. Made in many widths the paper is available in various weights.

Crash Finish.—Any paper or board, plain or printed may be grained or embossed with a finish such as Crash, Linen, Hopsack, and used for box-making, linings and box tops.

Embossed Paper.—There are many new designs in the field of roller embossing and these may be applied to paper and board, both plain and printed. Signature papers which carry the name, trade mark, brand or quality of the packager are often embossed in addition to the printed design.

Fastness to Light.—Tinted and coloured papers of many kinds may be made fast to light by the addition of suitable dyestuffs in the pulp stage of paper-making. This quality has to be specified.

Film (Cellulose Wrappings).—A generic term given to the various transparent wrappings made and marketed under various trade names and used for visible packaging. Available in sheets and on reels; they can be used plain, coloured or printed.

Filter Paper.—An unsized chemically pure paper made of rag, used in chemical laboratories for filtration. It must be free from loading, or any trace of alkalinity or acidity.

Flint Papers or Friction Glazed.—Tinted or coated basic paper, receiving a very high glaze on the friction glazing machine, such paper being used for packaging and wrapping many kinds of products. The paper is protective, waterproof, finger-proof and printable.

Foils.—These papers may be aluminium or bronze powder coated on to a basic paper; they may be actual metal or aluminium foil or foil laminated to a base paper. Used for bag-making, wallets, satchels, wrappings and for packaging purposes and printed brand labels and seals. Coated foils are also available with adhesive coatings for label work.

Gift Wrappings.—Current term used in connection with specially designed fancy wrapping and packaging papers used for birthdays, weddings, special occasion gift packages.

Glassine.—Glazed transparent made in colourless and some colours, plain and embossed, and used for wrapping certain chemicals and allied products.

Greaseproof.—A popular grade of paper used for wrapping greasy foodstuffs, and other products where the exclusion of grease, moisture and dirt are important.

Gummed Papers.—Special gummed papers are made for sticking to glass, fibreboard, varnished surfaces, cellulose treated articles, plastic, metals, tinplate, etc. They may be printed by all the processes.

Gummed Tape.—Used for sealing kraft wrapped packages and fibreboard containers and cases. Made in brown and colours and many widths, it may be printed as specified. The best grades are made to specification laid down by the British Standards Institution and other bodies, and have a breaking strain and strength of considerable importance to packers. Current tapes are made from sisal and glass fibres, the coating being animal glue.

Header Bags and Labels.—Printed labels, often with heat-sealing qualities, currently used to seal and enclose viscose filmic bags containing powders, liquids, tablets, etc.

Heat-Sealing Papers.—Thermoplastic label papers, the base paper being varied and treated with waxes, varnish, gutta-percha or mixtures of these, such papers being applied by heat and pressure in the form of printed seals, labels and other printed work.

Hygroscopic Papers.—Base papers treated with glycerine and made flexible. Used for wrappings.

Ibeco Wrapping.—A kraft proofed by the incorporation of specially developed bitumen emulsion into the actual texture of the paper while still in a fluid state. The individual fibres in the paper are thus made waterproof. Made in sheets and rolls and supplied as case liners for use as multi-wall paper sacks.

Imitation Kraft Wrapping.—A substitute for chemical wood pulp genuine kraft wrappings which are stronger and more suitable for large and heavy bulk packing.

Kraft Wrappings.—A strong wrapping made from unbleached sulphite wood. Made in smooth or machine glazed or unglazed finishes, brown in colour and supplied in sheets and reels or as case liners.

Laminated Papers.—Paper or board material brought together by pasting, by pressure and heat or either. One material may be laminated to a different type of base.

Litmus Paper.—A chemical test paper produced by steeping filter paper in a tincture of litmus. Acids turn the paper red while alkalis turn the material blue.

Manilla.—High grade buff paper, very strong, some almost untearable. Used for tags and for packing purposes. The term is somewhat loosely applied to cheaper grades of paper used for wrapping, but made from wood pulp and not manilla.

Mean Tensile Strength.—This is the average value of testing results of strength in a sample of paper in both directions, i.e., machine and cross direction.

M.G. or Machine Glazed Papers.—Any paper with a smooth high finish on one side is termed thus. It may be applied to box coverings, krafts, poster papers and packaging papers.

Moistop.—A recent vapour barrier consisting of a two-way sisal reinforced sheet with two inner coatings of bitumen and a layer of polythene on one surface of the basic kraft. Has good bursting strength and moisture vapour transmission rate is high. This wrapping incorporates pressure sensitive cold seal closure properties and may be considered as one of the most advanced forms of wrapping. Used for bags, wallets, case liners and direct bulk wrapping.

Nitro-cellulose Treatment to Paper Surface.—Both plain and printed work may be either spirit varnished or treated with nitro-cellulose thus providing a waterproof, finger-proof, dust-proof flexible coating to the sheet. It will fold without cracking and is scuff-proof. Brings out the rich colours in printers' inks and greatly enhances the appearance of the paper.

Pallets.—A semi-mechanical appliance used for stacking flat materials such as paper and boards, the pallet being made from wood or metal. They obviate manhandling of stocks as the stack thus made up may be moved by truck without handling a package.

Paper Sacks.—Chemicals of many kinds, powders and other materials are being packed in lined multi-wall paper sacks. They are durable, waterproof and are being extended to many new types of products.

Parchments.—Parchmentized papers are used for wrappings of all kinds where grease must be resisted and protection from humidity is important. Imitation parchments are made but invariably these are not so good as the genuine parchmentized papers.

Sealings.—Glazed or unglazed wrappings in various colours and weights with a special application to individual trade uses.

Seidlitz Blue.—Dark blue wrapping made for the chemist trade in particular. Used for packaging various products; is strong with wear resistance. The best are fast blue dyed—another name being sampling papers. Self blue is yet another term.

Self-Sealing.—A wrapping with a coating both sides of paraffin, rubber or some thermoplastic recipe which is stuck together by heat and pressure.

Signature Paper.—A specialized wrapping material with a design embodying a packager's name, brand or trade mark in the form of an artistic pattern, such a design being the sole property of the manufacturer. It may be used for wrapping products, packages, for bag- and wallet-making and other purposes.

Sisalation.—This is a reflective thermal insulation and moisture barrier composed of standard sisal fibres and kraft with a highly burnished foil lined on one side. Used for case liners for sensitive materials, scientific apparatus and laboratory protection in transit. It will protect such merchandise against damp and heat conditions as prevail in the Middle and Far East. Also made with aluminium foil lined on both sides of a kraft base paper and having a very high bursting strength and moisture vapour transmission rate.

Slide-Off Transfers.—Cellulose slide-off transfers are used for branding and labelling high class items put up in many types of containers. They are transparent, flexible and easy to apply. The base paper is coated with a cellulose film and this takes the printing. They look very attractive when printed by the silk screen process in colour.

Special Occasion.—An alternative name for gift wrappings including designs for Christmas, Easter, Mother's day, weddings, gift packages and other festive purposes.

Strength Tester.—Is the name given to the various instruments for evaluating strength and breaking strain of paper, the Mullen being one of the most popular testers.

Sulphites.—Wrapping papers made from sulphite wood pulp. They are very strong and are made in both bleached and unbleached form.

Tissue.—Varying in grade from fine white bleached qualities made from rag to straw and wood qualities. White and coloured are made.

Varnishing Paper.—Hard sized paper made for varnishing after printing in the case of label work, box tops, wrappings and packaging papers.

V.P.I. Grade Papers.—Base paper coated with a vapour phase inhibitor, providing a corrosion preventive wrapping for sensitive metal surfaces.

Vegetable Parchment.—An alternative description for parchments used for wrapping oiled and greasy materials and substances.

Waxed Tissues and Parchments.—Waterproof and protective papers coated with melted paraffin wax and made in several weights in sheets and on reels.

Wet Strength Papers.—Paper and board made highly resistant to water vapour and used for packaging where the need for special protection against moulds and bacteria is essential. This special property is imparted to the paper by various synthetic resins. Many types of paper may be treated in this way.

Willesden Paper.—Kraft or other strong paper which has been rendered waterproof by immersion in cuprammonium solution. Paper treated in this way becomes waterproof, rot- and insect-proof and almost non-inflammable.

Many of these papers have a special application in the packing of various products, and samples may always be obtained for testing and experiment by the packager of various kinds of products.

Progress

'Boil-in-Bag' Packaging.—Considerable progress has been made in this field and British Cellophane Ltd. have some new films to offer in this special form of food presentation. These are BCL nylon 6 film and BCL polypropylene film.

Tests carried out by the Technical Service Laboratory of this company show that both these films can be successfully used for 'boil-in-bag' packaging. Pouches of the films containing kippers withstood cooking in boiling water. In each case, the characteristic odour of cooking kippers was prevented from escaping from the bag. For 'boil-in-bag' packaging it is desirable to exclude as much air as possible from the pack in order to prevent it from floating or even, in some cases, bursting. Both films performed well in this respect.

BCL polypropylene film has a much higher yield than Nylon 6 and is considerably cheaper. The problem of printability is still under examination. For the present, one solution is that boilable packs should be overwrapped in printed cellulose film which would be stripped off before cooking.

Although considerably more expensive, BCL Nylon 6 film can be printed by standard methods. Suitable inks are available which will withstand immersion in boiling water. A high temperature must be controlled within close limits.

A number of food manufacturers have expressed interest in both these films and are currently carrying out trials with them.

At present, the main outlet for 'boil-in-bag' packaging appears to lie in kippers and other types of fish. There is, however, a strong possibility that this form of packaging will be increasingly used even for complete 'heat-and-serve' meals.

BCL Nylon film has extremely high strength, greater than that of a comparable gauge of polythene film. It withstands folding and has great resistance to tearing and scuffing.

Its melting point is 215°C. (419°F.). It will withstand temperatures up to 180°C. (356°F.), and can thus be immersed in boiling water so that products inside a nylon pack may, for example, be reheated or sterilized without the film being removed.

It is not affected dimensionally by normal changes in temperature or relative humidity. It remains flexible at temperatures as low as -50°C. There is no plasticiser in the film the loss of which could cause embrittlement.

The nylon film is resistant to most organic solvents and dilute alkalis, but should not be used in contact with strong acids. It has extremely high resistance to oils, fats and greases, does not support mould growth and is impermeable to bacteria. It has low permeability to air, oxygen and carbon dioxide. It is extremely resistant to odour-penetration, and its water-vapour permeability is very much higher than that of polythene. Tasteless and non-toxic, it may be safely used in direct contact with all kinds of foodstuffs. It has insulation properties which are adequate for low and medium voltages.

Other advantages are that it can be heat-sealed by the same methods as polythene, and also by the high-frequency technique, although the sealing temperature is high, and it can be printed by standard methods without the necessity of keying.

Its full potentialities in the packaging field have yet to be realized, but judging from its basic properties it evidently has a considerable future.

Pre-cooked products can be prepared for the table while still in the pack, as the film withstands boiling water, thus enabling the food to be re-heated.

Because of its toughness and abrasion-resisting qualities, it can also be successfully used as a lining in containers for heavy or 'awkward' equipment, for the packaging of a variety of liquid products such as shampoos, detergents, fruit juices, unit doses of lubricating oil, etc., and for the packaging of food products with high odour or of a greasy nature.

BCL nylon film is supplied in sheets or in layflat tubular form.



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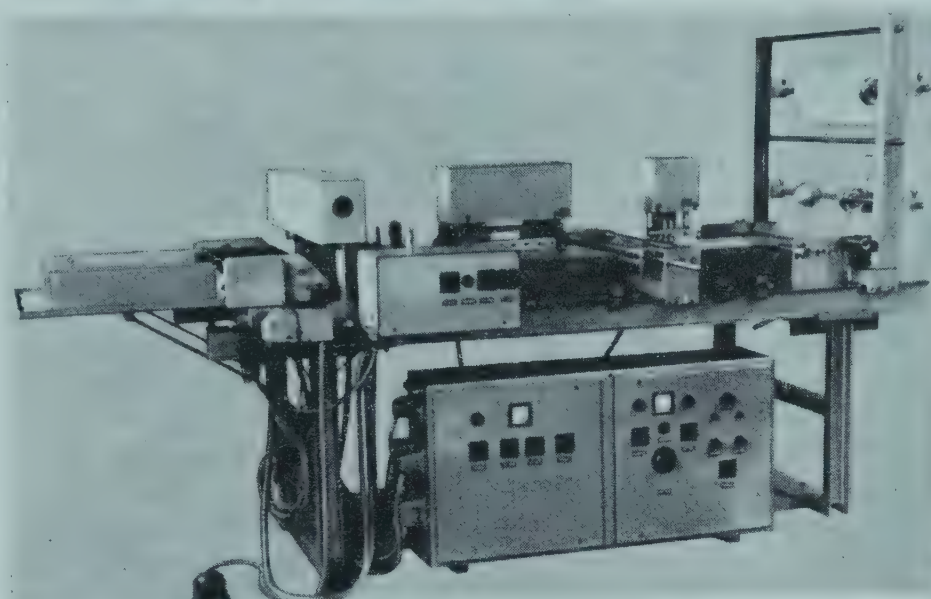
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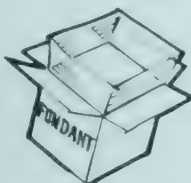
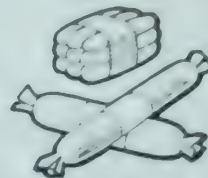
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CHAPTER 5

Packaging Materials—Sheets and Reels, Aluminium Foils and Laminates

ALUMINIUM foils and foil laminates are among the most versatile of packaging materials and are widely used for wrappings, bags, labels, all designed to protect and add appeal to the product throughout its display and storage life. Every packaged product at some point of its life may be subjected to risk of mechanical damage or contact with environments that can bring about varying degrees of deterioration. The physical characteristics of the product, the type of package and ease of its opening and reclosure, where this is essential, the desired shelf life, and the type, price and availability of the appropriate packaging material, are all relevant governing factors. Often the importance of decorative effect and sales appeal may be extremely important, and in this respect the packaging material itself can prove to be of infinite assistance. Aluminium fulfils the major requirements of packaging. At the same time, the availability of machinery and the characteristics of the packaging material are also factors which have to be considered in relation to fully automatic packaging techniques. Again, continuity of supply, consistency of properties and reasonable stability of price are some important reasons for the selection and usage of aluminium. It would appear that aluminium ore deposits are ample for all foreseeable packaging needs and the steady expansion of extraction plant has continuously ensured that supplies of metal are calculated to keep pace with the market demand. Aluminium may not be the answer to the cheaper container or type of wrapping, as compared with other materials, but its combination of technical, economic and aesthetic advantages has so strongly commended it to the package designer that packaging applications of the metal have grown from small initial usage until they account for approximately one-tenth of the output of semi-fabricated aluminium products in this country. The particular properties of aluminium that are of value from the standpoint of packaging are its impermeability to moisture, non-toxicity, ease of packaging forming, high reflectivity to light and heat, high resistance to corrosion, pleasant natural appearance, good strength, amenability to decorative embossing and printing, and lightness of weight. These are some of the outstanding factors which at once fulfil the requirements of the packaging industry, not the least, the food and beverage trades.

Aluminium foil consists of thin sheet aluminium below 0.15 mm. in thickness and is supplied in roll or sheet form. Most commonly it is produced from commercial purity

aluminium conforming with British Standard Specification 1470 SIC, namely—Aluminium (not less than 99 per cent) copper (not more than 0.1 per cent) silicon (not more than 0.5 per cent) iron (not more than 0.7 per cent) and manganese (not more than 0.1 per cent). The process of foil manufacture to suit it for wrapping and packaging is exacting in order that it will meet the desirable requirements of individual trade usage.

Uses in Packaging.—In order to determine the use of aluminium foil and foil laminates in packaging projects, one must consider the primary functions of a packaging medium. In the first place, any chosen packaging material must be hygienic where food is involved and it should also afford ample protection against dirt and dust while the product is on display. It should also be proof against grease, varied weather conditions, bacteria, any physical damage as a result of constant handling, and damage by light resulting from window display and moisture present in the atmosphere. The wrapping used to protect a product must not on any account impart off-flavours and generally, it must act as an insurance of the retention of the original factory or farm fresh product quality. The next important function of a wrapping is ready identification and in this direction, the material must be capable of carrying brand name, trade mark, design, recipe instructions and any other necessary matter. Wrapping must of necessity be attractive and in this sphere, there is perhaps nothing quite so appealing as the lustre and brightness of foil, plain, printed, or embossed. Foil is flexible and when fully annealed can give dead folding. This provides a close wrap for ample protection of the product. Inks have been perfected so that foils may be printed in full colour with both design and letterpress matter. Embossing is applied to foil and any pattern or design may be chosen from the hundreds of styles now available. Special designs in the form of the signature paper may be arranged where considerable quantities are involved. Both printing and embossing lend themselves to the immediate identification of a brand or quality of product. Foils are without doubt fully hygienic and afford the desirable protection for the packaged product. Being opaque, they do not transmit light and therefore afford ample protection for fatty substances such as butter or margarine and other substances, the deterioration of which is promoted by light. Foil itself is highly reflective to heat radiation, reflecting back about 95 per cent of all radiant



Foil wrapped cheese in decorative boxes.

heat which falls upon it. It is tasteless, odourless, non-toxic and does not support mould growths. Unlike many plastic films it does not embrittle at low temperatures nor does it soften at high temperatures. Uncoated aluminium is non-inflammable and again, unlike many plastic films, does not hold static charge when it is unrolled on a reeling machine. Probably the most important property of aluminium is its barrier effect against the passage of moisture vapour, odours and gases. Aluminium foil is a sheet of metal and in the absence of perforation it is an absolute barrier to moisture odours and gases. Articles efficiently sealed in foil can neither pick up, nor will they lose moisture, aroma or odours and this is specially important to the food packager.

There are two points which have to be satisfied if aluminium foil is to serve as an absolute barrier, one is efficient sealing of seam and closure and the other the freedom from pinholes. Foil in the thinnest gauges usually contains a number of perforations and this will depend upon the substance of the foil. These perforations are usually less than one-thousandth of a mm. in diameter and vary in number from an average of about 400 per square metre at .009 mm., and 80 per square metre at .012 mm. downwards at the heavier gauges. Where an absolute barrier is required, the packager should use a heat seal coated foil, free from perforations and heat seal the package. In some instances, an absolute barrier is not essential however.

Foil Laminates.—As compared with film materials which are rarely below about .025 mm. in thickness (one-thousandth of 1 in.), thin aluminium foils are relatively weak and to overcome this weakness from the packager's standpoint, it is common practice to reinforce the foil by laminating it to some kind of paper or film. The type and substance of a paper is selected to give properties and the desired strength in the final wrap, and materials used in lamination may be as light as an 8 lb. tissue. There are laminates of glazed imitation parchment, glassine, greaseproof, parchment or a suitable kraft backing paper to foil. Suitable adhesives are used in the various combining processes, these having an application to the ultimate usage of the foil laminate. An important fact which must be considered when using a laminate of paper to foil is that while aluminum foil is completely stable dimensionally under varying humidity conditions, paper and most films take up moisture and expand when atmosphere humidity is high and lose moisture and contract when atmospheric humidity is low.

The packager using foil laminate has a paper, a dimensionally live substance which comes and goes with changes in humidity, married to a dimensionally stable substance foil. However flat this laminate is, there will be some other atmospheric humidity at which the paper will have expanded or contracted in relation to the foil causing curling. When the laminate is in reel form it will not be difficult to handle. However, in cut sheet form the curling may be somewhat trying. Curling troubles may be reduced by storing packages beforehand under conditions favouring flatness and keeping only about one hour's supply available. It is recommended that the cut sheets should be stored overnight before use in a warm dry room or cupboard at not less than 60° to 65° F. Flattening a pack by bending it back in the opposite direction to the curling can cause difficulty in magazine fed machines where the wrap is taken from the pack by feeds with grip near the edge. With such a feed the pack should always be a flat one with straight true edges.

Foil is also reinforced with film and laminates are obtainable of cellulose acetate film to foil, cellulose foil to foil, Pliofilm to foil, and polythene to foil. Pliofilm or polythene are usually applied to the side of the foil which will be inside a heat seal pack as these films combine excellent heat seal properties with reinforcement of the foil. Cellulose acetate and cellulose films are usually applied to the side of the foil which will be outside the pack. The



Foil wrapped fresh food products (Venesta Ltd.)

brilliance of laminates of this type where the film is reverse printed and where one looks at the print through the thickness of the film, is very notable, and many packagers are willing to pay the additional price of a film laminate in order to provide this superior appearance to the product. A thermoplastic adhesive, which can be coloured, is usually used for lamination although polythene laminates are often made without an adhesive. By selection of a suitable film for lamination to foil it is possible to improve the protection against odour offered by a foil containing perforations. The moistureproof transmission of foil, no matter how thin, is usually lower than that of materials combined with it so that the m.v.t. rating of a foil product will usually depend on the gauge of the foil, rather than on the backing material. Package performance strength tests will be affected more by the backing material and the type of seal or closure than by the foil. It should be appreciated that though a film will reduce the rate of transmission of moisture vapour through a perforation, it does not stop it.

One of the most promising of the newer laminates is that in which polythene is combined with foil. The laminate of polythene to perforation-free foil is likely to prove as near the perfect moisture and odour barrier as is possible with flexible wraps. It is generally known that polythene has a remarkable resistance to chemical attack. In a polythene-coated foil, the foil imparts to the polythene the moisture, gas and odour proof properties which the polythene lacks while the polythene will protect the foil against corrosion by corrosive substance with which it is in contact.

Foil Coatings.—Various types of coatings are applied to aluminium foil for a wide variety of purposes which include:

- (a) Provision of a heat sealable surface.
- (b) Protection of the metal surface in order to prevent corrosion by any corrosive substances in contact with it.
- (c) Protection of the surface of the foil against scuff and abrasion.
- (d) Prevention of offset of printed matter on to heat sealing jaws and hot plates when making a heat seal closure.
- (e) Priming the foil's surface in order to provide a medium which is readily printable.
- (f) To lubricate or impart slip to the foil.

In practice, one coating often performs more than one of these important functions, but the manufacturers consider it is better that a coating should be formulated with a definite end in view.

Aluminium is attacked by acids and the like which are present in various kinds of foodstuffs but so effective are the protective coatings which may be applied to foil surface, that the packager may deal with corrosive materials with complete confidence. The foil used in packing small portions of cheese, for example, demonstrates a protected foil. Where foil is being used for a new packaging project, samples should be tested under field conditions in order to establish suitability and advice may be sought from the foil supplier.

Heatsealing of Foils.—The importance of heat sealing in



Foil laminated with greaseproof backing (Venesta Ltd.).

obtaining the full advantage of the barrier effect of aluminium is fundamental. Heat seal foils are now in common usage and their properties are understood. Most standard heat sealing machines work at temperatures in the region of 130°C. and excellent coating formulations exist for sealing, using these machines. As the aluminium is an excellent conductor of heat, the sealing is practically instantaneous. A properly formulated coating is so sticky that with unlined foil a cooling cycle after the heating cycle is unnecessary, for the closure will hold on removal of the pressure and while the pack is cooling. It may not be realized that an alteration in specification of the barrier may affect sealing conditions with the same coating. It may be to the advantage of the packager to test time dwell periods on various wrappings. Heat may be found to penetrate paper much more slowly than through a foil, the coating being slow to reach fusion temperature. If a reinforcing paper is thick, not only does the heat take a long time to penetrate but the laminate takes a long time to cool. If the join is under tension, the tack or stickiness of the coating may not be sufficient to hold it together unless pressure is maintained while the jaws are cooled.

For special purposes such as heat seal wrapping chocolate, or for small portions of cheese, very low melting heat seal adhesives are employed. It is not considered good practice in some quarters to use these adhesives for envelope packs which are manufactured, packed flat and sent to a separate filling station. Heat is conducted along the metal away from the portion actually under pressure and with a low melting coating, sealing may occur in an envelope in areas which a packager expects to find unsealed and ready to receive the product. The heat seal packaging of chocolate is a process which is being developed and is a comparatively new field for aluminium foil for the hermetically sealed chocolate is

far better protected against cocoa moth than is chocolate merely wrapped in foil or foil and paper.

Scuff and Abrasion.—The finished fine appearance of a foil package must be maintained at all stages and up to the point of sale. Tarnished packages repel sales and do not find a place in the shop window display. Something however, is carried out in the manufacture of aluminium foil to prevent undesirable scuff and abrasion. When foils rub against another surface the coefficient of friction is often so high that fine particles of aluminium will be abraded out of the surface of the metal. These particles are often so fine that they appear to be black, but when examined under the microscope their metallic character is immediately obvious.

Packages, the outer surface of which is aluminium foil, are liable therefore, to leave black marks if they rub against another surface. In this way, if half pound blocks of margarine wrapped in a foil parchment wrap are packed in wooden cases and sent over long distance by lorry, the vibration of the lorry may, unless the blocks are very tightly packed, cause the blocks to rub against each other. Traces of black, resembling dirt, would probably appear on the surface of the package thus spoiling the general appearance of the pack and bring with it complaints of spoilage from the retailer. A light coating on the surface of the foil however, cures the whole trouble.

Printing and Priming Foils.—There are occasions when to obtain the desired effect it is quite impossible to use a printing ink which can be put under heat and pressure without the printing inks sticking to the surface with which it is in contact. When this happens, a hard coating can be applied on top of the print which will prevent sticking. Progress continues with both grades of foil printing inks and their applications and advice may always be sought and obtained from the printing ink manufacturers.

Aluminium foil has on its surface a film of aluminium oxide which on the freshly annealed foil is well adapted to take printing inks. On exposure to air or if the foil is reeled up in contact with paper, this oxide layer can pick up moisture and it becomes more difficult for the printer to get proper adhesion of his printing inks. Where the foil is to be printed some time after annealing and particularly if the foil is to be reinforced with paper or film base before printing, it is frequently desirable to apply a priming coat to the foil while it is freshly annealed, especially before paper backing to ensure a good printable surface.

Foil Lubrication and Storage.—For uses where the foil is to be deformed, for example, when capping cream and milk, it is often necessary for the foil to be lubricated. Foil suppliers think that this lubrication is best applied on the capping machine itself, because the packager or machine operative may then choose the lubricant best suited to the machine in use and apply it in quantity suited to the run and the purpose. Nevertheless, many users, particularly in the milk capping industry, prefer to use foil which is already pre-lubricated and aluminium foil is, in fact, sold in large quantities lubricated both with liquid, solid or semi-solid lubricants.

Aluminium foil is readily corroded when it is left wet. What is not so widely appreciated is that a spool of foil may become wetted by condensation on a humid day. A large spool of aluminium foil contains a considerable mass of metal. Large spools or reels of metal in store during winter months are subject to sudden change of weather conditions as from cold to warm humidity. In such circumstances, the foil may be slow to heat up relative to the warming up of air, and condensation of moisture on the foil surface can occur. This condensed moisture will pass quite rapidly in between the convolutions of metal and cause corrosion in a few days. The best possible storage for foil supplies is in a warm dry room. It is better when the foil has been thoroughly cooled not to bring it straight into warm surroundings. There are other causes of corrosion which are the concern of the converter rather than the actual packager himself. Foil laminated to base paper having a high chloride content, or which has been gummed to paper with a water gum and the surplus moisture left in the paper is also liable to corrosion. Precautions which may be taken by the foil converter to avoid corrosion include the use of a body paper of special specification and drying the laminate. Whatever precautions are taken at this stage, the ultimate product must be stored under proper conditions. No paper improves with bad storage conditions—damp, dirt, cold stone floors, hot steam pipes, draughts, strong sunlight—and foil is perhaps even more sensitive to bad conditions of storage than paper itself.

Radiation Sterilization.—This brief review of aluminium foil and laminates is mostly concerned with the present, but the atomic age is almost here. Large quantities of ionizing radiations will soon be readily available as a by-product of the large scale utilization of atomic energy for industrial purposes and the endeavours of the scientists have been turned towards the use of these radiations in the sterilization of food. For those interested in this aspect of progress a very comprehensive summary of the work to date was published in 1955 by the Department of Scientific and Industrial Research in Special Report No. 61 'Scientific and technological problems involved in using ionizing radiations for the preservation of food.'

One of the advantages of radiation sterilization is that it is possible to sterilize products in their final containers without processing stresses such as can be involved in heat sterilization. Light packages are better than heavy, as less radiation is stopped, and aluminium is the best of the common metals for transmitting radiation. Plastic films appear most attractive but suffer as a result of some disadvantages, especially moisture and oxygen transmission. The report in setting out points in which polythene fails to reach the necessary standard because of oxygen permeability, points out that 'combination with aluminium foil overcomes this difficulty'. Considerable progress in the use and application of foils in all their thicknesses or gauges may be expected to the general interest of the packager and the printer.

Aluminium Foil Application.—Perhaps the best known application of foil is in connection with the milk bottle cap

where various colours are used to grade qualities. The dairy industries maintain factory and dairy freshness in the packaging of cheese which deteriorates rapidly unless packed in a more or less airtight and moisture-proof wrapper. Butter, especially the unsalted variety, rapidly becomes rancid if exposed to air and light, while a foil wrapper excludes both and assists in the maintenance of freshness. Ice cream and other milk products are also preserved in foil wrappings. Foil laminated to vegetable parchment made to British Standard Specification are used to wrap fats, butter and margarine. The sale of dehydrated soups in powder form is an example of the rapid development of the metal foil bag and the moisture-vapour barrier foil laminates provides for all kinds of powdered products. Bottle caps and closures made from foil in various bright colours with embossed and printed designs assist in attractive packaging and ensure constant and low display in the retail shop window and store. Metal foils are also used for heat seal and gummed labels, seals, cameos, tags, box tops, linings and the extended application of metal lined papers continues in all directions in the realm of packaging.

Types of Containers and Packages made from Medium to Heavy Gauge Aluminium. (a) *Built-up Containers.*—The built-up or three-piece method is often used in the construction of aluminium containers and the excellent working properties of aluminium in sheet and strip form, particularly its ease of formation and manipulation, permit its use in established processes of manufacture. The basic method of built-up container make up are the same as for tinplate, but naturally, the properties differ, therefore certain changes in technique are necessary. For a given container design, pure aluminium sheet should be approximately 20 per cent thicker than if tinplate were used, but aluminium alloy may often be used in the same thickness as is the case with tinplate. Container bodies may be made on the simplest equipment, or rapidly made on automatic machines which cut and form the sheets to the required shape and join them by a lock seam. The bases may be double lock seamed to the bodies also on automatic machines. Where it is necessary to exclude air and moisture, the seams may be sealed with



Three-piece all aluminium Swiss cans for jam and honey.

a rubber compound, as with tinplate cans. Built-up aluminium containers can be circular, oval, rectangular or any fancy shape, and since they can be decorated in an unlimited range of designs and colour variations, they make first class food presentation packages for seasonal and other festive occasions for such products as biscuits, cakes, tea and high class foodstuffs. They are both attractive and durable and many are designed with a definite after-use appeal value in the household so that the brand and trade name of the product is remembered long after the contents are used, and there is no unsightly rusting of the containers. Containers are completely dry and may be used for dry products such as milk powders, coffee, cocoa and many liquid and semi-liquid substances such as syrup, cream, etc. Composite aluminium-cardboard containers are ideal for products having quick sale and a maximum storage life of some six months. These containers consist of a cardboard body having an inner or outer lining or both of aluminium foil, the ends being of aluminium sheet or tinplate seamed on to the body. They withstand rapid filling on automatic machines and in most cases the end caps are seamed on to the bodies after they have been filled.



Aluminium containers used for canning various kinds of fish.

(b) *Shallow Formed Containers.*—Round or rectangular shallow containers including lids for deep containers, of depth up to about half the diameter or half the shorter side, can be made as single pressings. Hand, foot or power operated presses are used, according to quantity required and the speed of production. The tools are usually of the combination type, where blanking and drawing operations are performed in a single stroke of the press. Production speeds on automatic feed machines are in the neighbourhood of some 120 to 200 pressings per minute and even more where multiple die tools are employed. As the displacement of metal during shallow drawing is not too severe, decorated or lacquered sheet may be pressed without damage to the surface coating. Continuously anodized



Alu-Cup containers made of lacquered aluminium foil holding 3 fl. oz. They are used for the packing of jam, frozen eggs, powdered soups, jellied eels, etc.

aluminium strip, which has a protective oxide film, may also withstand moderate metal forming processes. This development, and the possibility of obtaining lacquer-sealed and printed strip, may substantially reduce the cost of producing shallow formed metal containers.

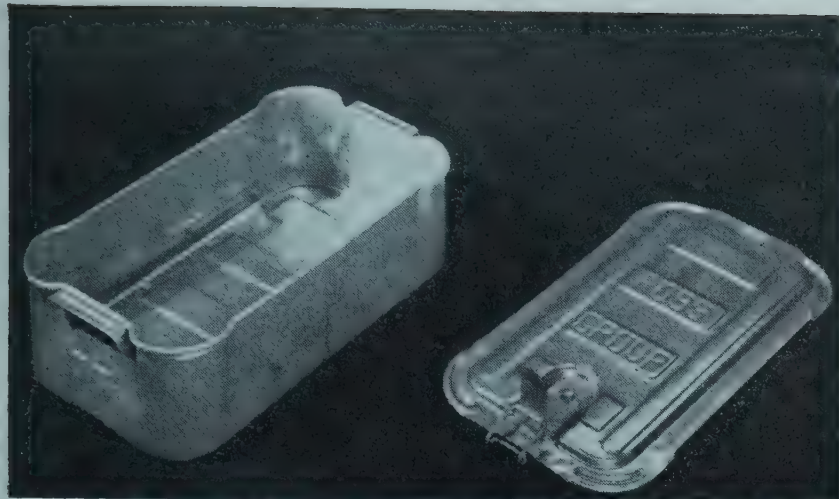
Such containers are used for packaging fish, meat and vegetable products and other processed food products. Shallow drawn tins of aluminium are used very extensively in Scandinavia. When used for processed foods, the inside surfaces of the cans are lacquered, the lacquer being applied by roller to the sheet or strip before the can is drawn to shape. When processing food in aluminium cans, cooling after pressure is recommended in order to balance pressure generated inside the can during sterilizing thus obviating any risk of distortion. Shallow rectangular aluminium boxes with hinged lids are ideal for packaging a wide variety of products. Such boxes may range in size up to approximately 6 in. \times 4 in. \times 1 in., and have the advantages of light weight, rigid containers with high corrosion resistance. The last characteristic ensures that there is no deterioration of the efficiency of the container or of its decorative presentation, and this may be a feature for packs which may be in use for a long period. Aluminium closures of many types and sizes are made from lacquered and decorated sheet. These caps are blanked and drawn in a single press operation and afterwards beaded, threaded and knurled as required. When required for fitting to screw-necked bottles and jars, the plain caps may be applied to these and then rolled into the threads, thus making a very effective seal irrespective of variations in the glass thread. 'Rolled-on' jar and bottle closures make first class display

and efficient forms of closure. Made from decorated aluminium sheet, they can be most attractive. Vacuum cap closures are made from lacquered and decorated aluminium sheet; they are lightly crimped under the neck rim of the jar during application, and the vacuum is maintained by a plastic sealing compound. Such closures are easily removed on account of their serrated edge. They are popularly used in the packaging of jams, spreads and similar food products.

(c) *Deep Drawn Containers.*—The deep-drawing process is often used for the mass production of metal containers and for aluminium the type of presses and tooling used are generally the same as for other metals. Single-action presses are more satisfactory for small containers, and double-action presses for larger sizes. Many types of drawing attachments are available for fitting to single-action presses in which a movable portion of the die is actuated by the descending ram. They are frequently used instead of double-action presses. Very deep drawn containers made of aluminium alloy are better produced on hydraulic presses, because drawing pressures can be applied slowly, thus avoiding damage to the blank by the sudden impact of crank presses. The high ductility of the metal permits pure aluminium and the softer alloys to be deep drawn without interstage annealing and with considerably less power than that required for other metals. The extent to which sheet can be drawn differs with the various alloys and their rate of strain hardening. Reductions of up to 50 per cent of the blank diameter are possible for single-drawn containers made of pure aluminium, but for multiple draws the reduction at the first stage is usually a maximum of 48 per cent followed by successive reductions of 30 per cent, 25 per cent and 20 per cent. Deep-drawn cans are drawn in several stages, either by traditional redrawing methods or by a combined drawing and ironing process. In Switzerland,



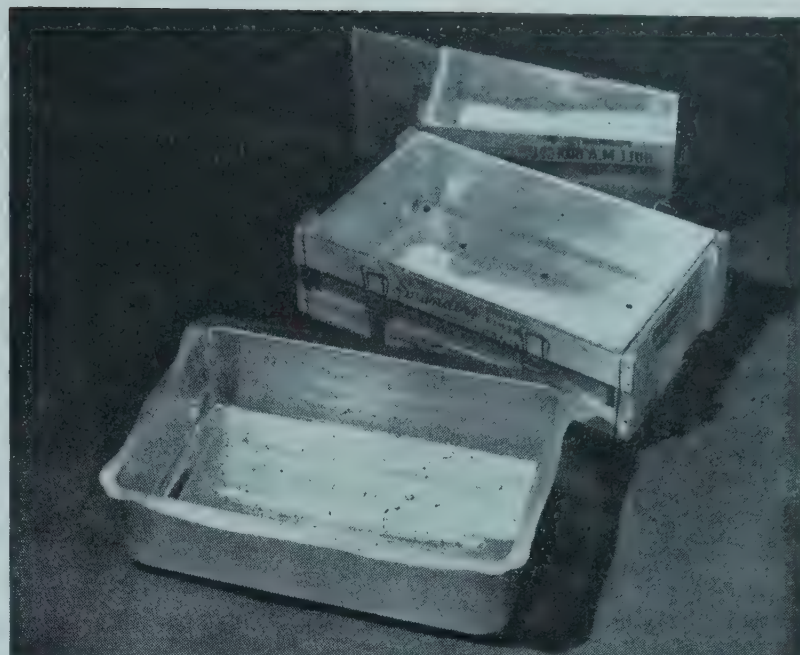
A deep drawn aluminium can for condensed milk.



Above: aluminium fish container and on the right, a patent liner crate. The lid of the box is held by springs and the interior box can be taken out, washed and used for an indefinite number of times.

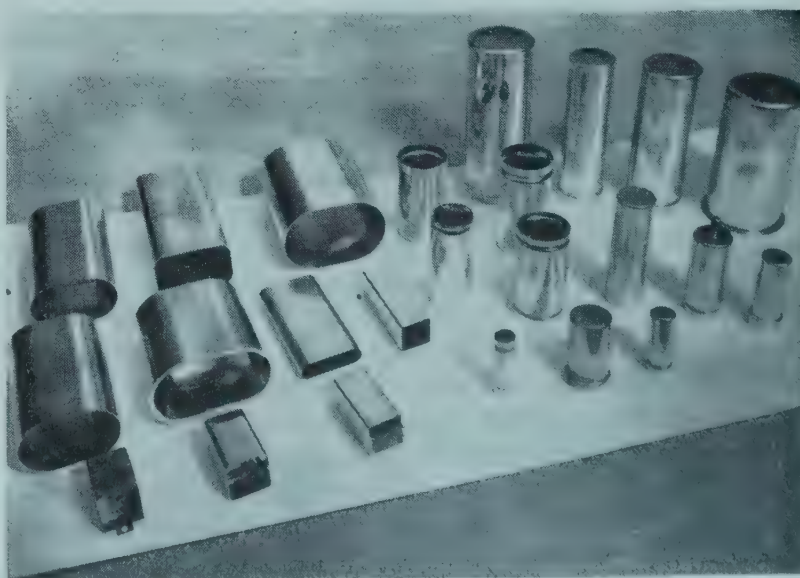
aluminium cans produced by the latter process are used extensively for condensed milk and flavoured creams. They are often anodized after forming and where necessary, lacquer is sprayed on to the interior surfaces. Although the production rates of deep drawn containers are lower than for the built-up type, the container itself has many advantages, particularly for packing liquids and powdered products such as dried milk. As perfect air-tightness is ensured by the seamless construction, such containers are suitable for vacuum packs. The absence of a side seam gives the further advantage that a lid or shoulder can be double-seamed to the can more efficiently. As considerable displacement of metal occurs in deep drawing, decorative coatings must be applied after drawing. An ironing press has been developed in which the blank is first cupped and then ironed in a straight-through action through series of dies having successively smaller diameter. This is the Keller process. This method produces a deeper container than is obtainable in a single drawing operation. A technique is now being finally developed of locally annealing the outer sections of hard blanks; this is known as differential annealing. The blank is annealed only in those zones where considerable deformation will occur in drawing—other zones, such as the centre of the blank, which will become the base of the drawn container, after left hard. The nett result is a reduction in the number of draws necessary for certain types of containers. In the new process, 60 per cent cupping reductions can be obtained in cans of NS3 alloy, followed by a 50 per cent ironing in two dies. Containers of uniform hardness and strength are therefore possible, combined with cost savings due to the bigger cupping and drawing reductions obtained.

(d) Impact Extruded Containers.—Approximately 60 per cent of the collapsible tubes in this country are of aluminium and these, as well as many rigid containers, are produced by impact extrusion. This is a press operation. The female die has a shallow recess of the shape and cross-sectional area of the outside of the required container. The punch form is that of the inside contour of the container and is long enough to accommodate both the extruded part and a



stripper. Impact extrusion can be performed on mechanically operated presses of various types, certain automatic horizontal presses produce up to 75 extrusions per minute. The process is most suitable for containers requiring (a) a high length/diameter ratio, (b) a thick bottom on a thin-walled tube, (c) a base incorporating a boss, stud, screw thread or cavity, or (d) irregular profiles, longitudinal ribs or other variations in cross-section. The factor controlling length/diameter ratio is the slenderness ratio of the punch. Values of 6:1 or greater are obtainable in diameters of $\frac{1}{2}$ –4 in. The larger sizes of impact extrusions can be made only of aluminium. For plain, round shells with flat bases, it is considered that impact extrusion is more economical than deep drawing where length/diameter ratios exceed $1\frac{1}{2}$:1. It may be noted that as the extrusion punch must be held some distance from its striking end, and it penetrates only a little way into the slug and die, any lack of symmetry in the side walls of the shell tends to create lateral forces which deflect the punch.

The impact extrusion process work-hardens the material, and the extruded shells for collapsible tubes must therefore



Typical impact extrusions—a large variety of shapes can be extruded provided they are symmetrical around the punch.

be annealed to restore them to a soft condition. Further operations on collapsible tubes are trimming, threading, printing, internal coating and cap making, and there are special-purpose lines of machines which perform these at production rates up to 55 per minute. For printing, one, two, three or four colours may be applied on white or coloured tubes of various diameters, at speeds up to 2,000 per hour, by offset rotary printing machines. Internal coatings are applied by machines which incorporate a long spraying nozzle and ensure a uniform coating over the entire internal surface, including that of the tube nozzle. Internal and external coatings are dried by stoving in suitable ovens. Protective coatings are chosen by actual test against the product to be packed and are usually selected from:

- (a) Stoving resins of the epoxy type.
- (b) Evaporative coatings of the vinyl copolymer type.
- (c) Microcrystalline waxes.

It has been found that epoxy type coatings are suited for a wider range of products than are evaporative and wax coatings. With products very corrosive to aluminium it is often advisable for two coatings to be applied to avoid damage through pinholes. Collapsible tubes provide an easy and efficient means of packaging and serving food-stuffs in paste form and their use and application is being rapidly extended in this country. (See Chapter 1 which deals more comprehensively with tubes and their uses).

Foil Wraps and Packs.—Reference has been made in this chapter to the application of foils and foil laminates in connection with food and beverage packaging. It may be emphasized that this industry is growing and its products are finding an ever increasing use in the packaging of all kinds of foods in various forms. Foil of 99 per cent minimum purity aluminium is already well established for the purpose of packaging a wide variety of products and its main features are opacity, smart appearance and its service as a barrier to moisture. Foods, breakfast cereals, dairy products, bread, cakes, tea, coffee, cocoa, lemonade crystals, soups, products in powder or granulated form, meat extracts, yeast, frozen foods, fruits, and ice creams are among the popular products seen on display in the shop window and store that make first class impelling packs as a result of using foil in some shape or form. At the same time, aluminium foil is being increasingly used as a household wrap, especially for foods stored in refrigerators, for sandwiches, and in cookery for wrapping joints, poultry and game during roasting and for covering pudding basins and other vessels. Salt and similar products likely to absorb moisture may with every advantage be packaged in aluminium foil containers and thus retain their quality in the home and overseas markets. The minimum thickness of aluminium foil necessary to ensure reasonable handling in packaging operations with the maximum economical coverage is 0.008 mm. (0.000315 in.) this gives a coverage to 32,300 in. per 2 lb. Foil can be hand or machine wrapped in the plain, printed or embossed form, unsupported by any second material. Thicker foils, for example, 0.030 mm. (0.00118 in.) to 0.020 mm. (0.0008 in.) are used for non-

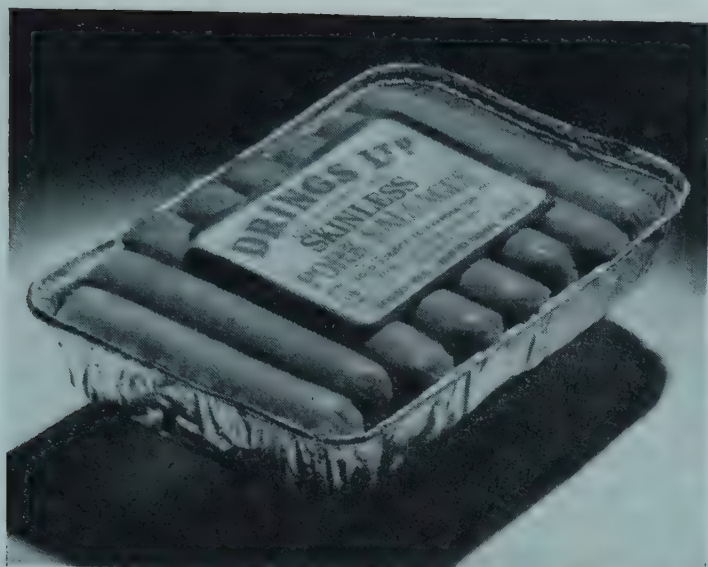
laminated foil envelopes. There is nothing outside the possibilities of both printing and embossing that may not be incorporated into the foil wrapping where really attractive packaging is concerned. Many types of foods and allied products may be wrapped as small units individually in gaily decorated aluminium foil thus becoming both attractive and hygienic while on display. Chocolate and confectionery are first class examples of attractive packaging with this medium. The added appeal given to the butter, margarine and cooking fats packs are also fine examples of packaging where flavour and weight are additionally preserved.

The number of flexible laminated foil packets now seen in the shop and store in display units is becoming almost legion. The protection of packaged contents in such operations is vital to the continued sale of the product. Unit or envelope type of packaging is definitely on the increase, the finished printed pack with its attractive borders and bands make first class eye appealing packages. Printed aluminium foil paper laminates in tape form make very attractive border bands for gift boxes and caskets, showcards and cake fills, and they may be obtained with gummed backs which will adhere to almost any surface after moistening.

Foil Containers.—These comparatively low cost pressed aluminium foil food containers include round cake pack and flan dishes, custard flan and tart dishes, pleated pudding basins, square food trays and pie dishes, fluted tart dishes of various sizes and shapes among other packaging items. Ease of forming aluminium foil has fulfilled a need for expendable containers which largely reduce handling in the preparation of ready-cooked and quick-frozen foods. They have been used on a large scale in the U.S.A., for some time and many shapes are now available in the home market; their growth is and will be even more rapid. They give a reasonably durable product strong enough to withstand quite severe handling, and they eliminate many wearisome kitchen tasks. With their aid, prepared foods are carried through all cooking operations and then go directly to the consumer. Costly operations such as steaming, washing, drying and handling tins during food preparation are



Printed foil packaged soups.



A metal foil container in which the sausages are cooked and served. The container can be re-used.

dispensed with. The foils used for the various types of basins, dishes, pans and shapes vary from 0.030 mm. (0.00118 in.) to 0.15 mm. (0.0059 in.) according to size and service conditions. The foil may be plain, but it may be given a protective coating if the product to be packed is likely to be aggressive to aluminium. Foil containers are produced by press forming or folding on a set of mandrels or die boxes. Closures may be of foil or of foil laminate, and in some cases windowed card covers add to their novelty by disclosing the contents of the container. They may be embossed with decorative designs or brand names and these may be incorporated in such a way to increase the rigidity of the container.

At present, the available shapes and sizes range from patty pans 2 in. diameter \times $\frac{3}{4}$ in., deep to oblong closable containers 8 in. \times 4 in. \times 2½ in. deep. The closable type of foil container is made with a horizontal flange and a vertical edge which is mechanically clenched down on to closures after filling.

Seals, Capsules and Labels.—Aluminium foil and thin sheet have been increasingly used over the past years for many types of seals, capsules and labels in connection with packaged products. They are not only attractive but durable. Foil laminates or metal lined papers are readily available gummed in sheets, reels and coils of various widths and diameters and the adhesive coating varies in relation to the surface to which it has to supply. A gum recipe is made to adhere to most surfaces used in modern packaging and in addition, heatfix recipes and self-adhesive formulae are also available for other forms of closure and sealing packages. Chapters 5 and 12 deal with methods and materials used for all forms of labelling.

A process capable of applying capsules direct from the reel to bottles is now used in several British factories. The foil is coated with a re-moistening adhesive and when the bottles are damped, the capsules stick to the glass. Foil seals are practically moisture-proof, as the foil prevents the ingress of moisture to the paper and adhesive. The good adhesion of foil labels is particularly noticeable on products

stored in refrigerated conditions. They withstand rough and frequent handling and resist grease, insects and other forms of contamination.

Special techniques have been developed for the decorative design work on foil seals and labels to ensure that their identity is not lost in brilliant sunshine, or shop window lighting. Elegantly embossed seals, either natural finish or lacquered in many colours, often impart an air of chic to the product. They add eye appeal to the product and ensure a good display in the retail shop and store. Cost is offset by this additional sales appeal and used in conjunction with bottled foods and beverages, they give the product a superior 'look' especially where used in conjunction with neck labels, bands, seals or cameos. Often some economy may be effected on the cost of the container the finished appeal being added by the metal foil label. Many industries have long valued the appeal of the metal label or seal. Products so labelled display well under conditions of artificial lighting. Foil seals, labels and cameos may be used to hall mark bottled oils, liquids, and all glass packaged products. Viscose wrapped items such as sandwich spreads, jams, jellies, pickles and sauces, salad dressing also have a brighter appearance when labelled and sealed with the metal seal.

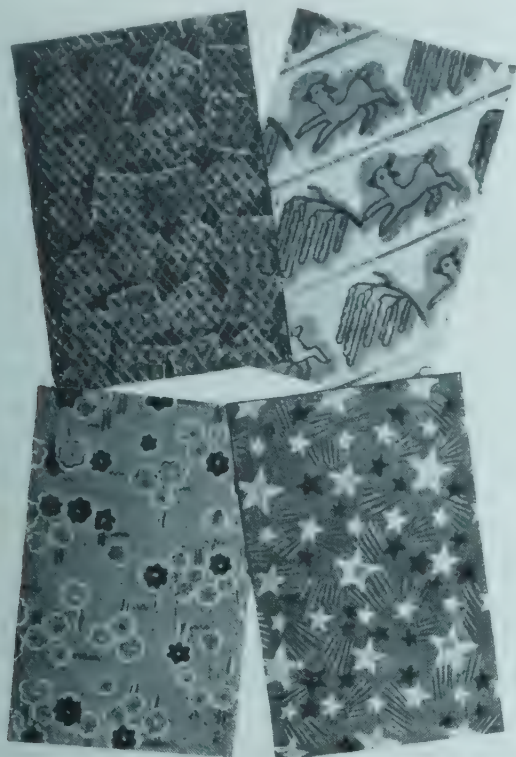
To sum up the properties of metal foils as outlined in this chapter, when used in conjunction with packaging schemes, they may be briefly stated as follows:

1. Impermeability to moisture.
2. Non-toxicity.
3. Pleasant natural appearance.
4. High reflectivity to light and heat.
5. Ease of forming.
6. High resistance to corrosion.
7. Ease of printing and forms of decoration.
8. Good strength.
9. Light weight adding little to bulk and weight of the packaged product.

In addition, one must not overlook the packaging possibilities of the various foil laminates which have so many applications in the packaging of fats and other greasy substances.

Progress.—A new foil-lined board biscuit box claimed to give protection against moisture vapour equal to that of the conventional biscuit tin, has been introduced by the New Merton Board Mills. Independent tests have been carried out by a biscuit manufacturer who packed 26 boxes with biscuits—two boxes of each of 13 different lines, for comparison. After they had been left under ordinary conditions of room temperature and humidity for 13 weeks, it was found that the average moisture gain was 0.7 per cent, a figure similar to that obtained with new tins. This high degree of resistance to moisture vapour is obtained by using aluminium foil lined kraft board and by careful design. The box is supplied in three parts, comprising a flat folded shell and two flat identical end pieces.

A new machine has also been designed by Packaging Machinery Co. Ltd., of Dartford to perform and heat seal all four corners of these end pieces. The shell is reinforced by 1 in. flanges on each open edge to give vertical and



Printed foil and embossed laminates for food product packaging.

lateral rigidity so that the finished boxes can be stacked to the same height as the conventional tin. The two end pieces are fitted to the shell by gummed tape using a simple jig, a method which enables the user to form a hinged lid at one end by cutting the tape on three sides. Closing the lid after use restores the resistance to moisture vapour.

Polythene Coated Aluminium Foil.—This is a new wrapping and packaging material in process of test. It has been tested on several 'Forgrove' wrapping machines with satisfactory results and further developments are awaited. The main advantages of such wrappings are polythene's excellent inertness to a wide range of products plus the fact that the aluminium foil itself provides complete moisture-proof qualities to the packaged product. There is, of course, slight porosity in the lowest gauges of foil, but this does not seriously affect the all-over moistureproof qualities of such wrappings in the case of certain products. This new material prints well by the photogravure process thus rendering the finished printed wrapping a first class eye appealing packaging material.

Aluminium foil and alloy is rapidly gaining increasing favour in view of its lightness as a package material as compared with tinplate, board and other thick material. Light weight packages which are fully protective for the product help to reduce freight and carrying costs, bulk and area space while goods are in storage. They are also lighter in weight for the housewife to carry away as purchases. This lightness of package weight is appreciated where a number of items are selected for the shopping bag from the self-service store and the supermarket. The fact that foils are attractive and readily printable renders them a new aid for impulse selling in the mass food markets.

Embossed Seals and Labels.—Gold, aluminium and coloured

foils are now extensively used as end and brand labels for many kinds of food products. Very attractive seals, cameos, and labels are being produced for both the food and beverage industries. These labels may be obtained cut as single units or supplied in the continuous reel so that both hand and automatic types of labelling, sealing, branding and coding products are taken into account. Both the heatfix and self-adhesive types of coatings are readily available in addition to the more established dextrine and pure gum arabic coated foil label. Foil labels may be both printed in several colours and embossed as desired, the finished item serving the purpose of a hall or brand mark for the product. As bottle labels for high class wines and spirits, they are unequalled in their appeal. There is also a wide range of aluminium foil embossed and printed tallies strung or with button slots. Their application as guarantee labels of quality, purity, or brand adds the finishing touches to the high class packaged product. Aluminium foil lined to card and board makes up a first class luxury carton for the gift or special occasion package, such lined foil being printable and embossable.

Tissues

Tissues are made in many colours, qualities and strengths and are popularly used for fruit, food, bread and bottle wrapping purposes, both plain and printed varieties. The basic material from which they are made varies from fine white bleached qualities of rag, to straw and wood pulps, such cheaper grades of tissues being used for wrapping everyday or less expensive products. Fine, thin, soft to very soft, unsized papers of this kind make first class inexpensive wrappings. In spite of their thin weight, i.e. Demy 5 lb. or 18 g. per square metre and upwards, they rarely tear unless carelessly applied. Food wrapping grades should as a rule be quite free from chemical substances which at the same time might scratch or harm fine surfaces and glass packaged products. More and more tissues are being used for bottle and bread wrappings and special grades of tissue are named bread or bottle wrappings or tissues. Available in bleached and unbleached grades, several colours are available. There are special grades for fruit wrapping which are printable and strong. Tissues are also used as liners for foils and other packaging papers and as liners for boxes, cartons, wallets and envelopes. Extra bulky types of tissues may be used as a protective padding for delicate products packed in boxes or crates. The ultimate use or application of tissue should always be stated when requisitioning supplies and sheets may, with advantage, be obtained from the supplier and tested.

Barriers

Under this heading come functional and protective packaging papers or wrappings such papers possessing specific properties not found in other types of wrappings. Such barriers are used where products have to be protected from moisture, greasy substances, vapours or certain chemicals from penetrating into the wrapped product and preserving the desirable moisture contents of a packed item. Various types of coatings, laminations or films lined to some basic paper or board, provide such properties. The

ideal is to select a barrier protective wrapping which will provide the desired effect for the product at the least cost and here again, some tests should be carried out. This point is emphasized on account of the fact that some protective wrappings will provide an all-round barrier against several undesirable elements which may not all be necessary.

The following lists of functional properties are outlined as those in common demand in connection with packaging materials and wrappings; they are not listed in any special order of merit or importance as this will have relationship to the user and his special needs: (a) Greaseproof or grease-resistance. (b) Waterproof or water-resistant qualities. (c) Water-vapour-resistance and water-vapourproof qualities. (d) Chemical and gas resistant qualities, (e) Heatfixing or heatsealing qualities (both self adhesive and heatfixing qualities are coated on to basic paper, fabric and allied material).

(a) *Greaseproof or Grease Resistant Papers.*—Among this group of papers is found aluminium foil laminated to wax papers, tissues, greaseproofs, etc., genuine vegetable parchments, waxed papers and high class greaseproofs, glassines, films, etc. In such papers there are no interstitial spaces in the fibrous contents, the surface presenting a barrier for the wrapped product. Tests may be made with products in order to establish the length of time, the applied barrier will serve its functional purpose. Certain items and products do not call for exacting greaseproof properties in a wrapping, but in the case of certain greasy foodstuffs, the failure of a wrapping to fulfil its function can render the product unsaleable. Grease can enter a package through seams and ends of a poorly sealed product. The use of a porous paper will also have an adverse effect.

(b) *Waterproof or Water-resistant Qualities.*—Various types of coatings and laminates will provide this functional purpose to wrapped products and papers may be selected and used relative to the degree of waterproofness desired, the product itself and the probable degree of water likely to come into contact with the packaged item. Expensive barriers may not be essential where a limited exposure is likely, as costs must always be watched. The type of weight of coating applied to a basic paper has many important functions and here again, advice may always be sought with testing sheets of a chosen paper. Generally speaking, waxed papers, glassines, foil laminates, lacquered papers and boards, offer such properties.

(c) *Water-vapour-resistance and water-vapourproof Qualities.*—Such properties in a barrier present some problems which await full solution. Even certain films and metal foils free from pinholes or any other form of apertures in the packaged product, can transmit minute percentages of water vapour. The transmission of water-vapour and gases is a function of many factors which include the over-all temperature of gas and of the barrier, the difference in pressure on the two sides of the barrier itself, the make up, grade, gauge or substance of the barrier and the area exposed to gas transmission. Papers used for such purposes are

designed to assist in the retention of original moisture and gas content of the packaged product over a specific period of time, relative to displayed or shelf life. Some kinds of frozen meats, while in store, may be inclined to produce 'freezer burns' on account of moisture diffusion out of the package and this is said to be due to the low moisture content of low temperature air outside the package. Here, advice, where needed, may always be sought from the packaging paper specialist so that the best material is used for the packaging process or purpose. Certain types of foodstuffs such as cereals, flour, and salt, must always retain flavour, moisture content present while resisting outside penetration. Other products have to 'breathe' and here the right film, wrapping or waxed material must be chosen and tested.

(d) *Chemical and Gas Resistant Qualities.*—Various barriers are made and designed to package foodstuffs and the requirements of the packager must always be taken into account as no one barrier will provide the over-all answer to full protection where desired. Coated barriers may be tested under field conditions, the tests being carried out in such a way that they match up fairly well with likely conditions to be experienced. It is well to bear in mind that any barrier used for foodstuffs should not impart odours, and be free from toxic components which are likely to impair the product itself.

(e) *Heatfixing or Heatsealing Papers.*—Thermoplastic coated paper based material is used for packaging, wrapping and sealing and the properties may be inherent in the make up of the paper itself, or applied as coated labels for application to the product by heat and pressure. They make a fused closure or seal for a package and are resistant to grease, water, water vapour, etc. Chapter 3 outlines heatfixing papers, their methods of usage and sealing. Heatfixing coating recipes may be applied to white, tinted, coated, film, foil, fabric, card, board and other material. The absence of water in a packaging project may be desirable in some forms of food wrapping. Fragile and heat-sensitive products such as chocolates and biscuits may be heatsealed with delayed action or 'Delatac' heatfix papers, or a label heated away from the package, as when the applied heat is removed, this type of thermoplastic coated label or paper will remain tacky for some time. The instant tack heatfix label is applied directly to the product immediately upon heating.

Food and beverage packaging ranks high in the usage and application of all kinds of functional and protective barriers. Protective packaging is a vital and integral part of the process of manufacture. Full protection at all stages must be given to many food products during their displayed and shelf life, in order to retain flavour, quality, nutrition and freshness, and in addition, in most cases, the package must have 'eye appeal'. The food packager uses a wide variety of barriers such as lined krafts, waxed papers and boards, genuine vegetable parchments, glassines, parchments, foils and laminates all of which have a special function to perform in packaging. Various kinds of filmic

wrappings rate high in the list of protective wrappings. Foil laminates often rank high in barrier protective function and are being increasingly used in many food packaging projects. Food packagers use various specialized films such as Cry-O-Vac, Polythene, Saran, Pliofilm, etc.

Paper converting is responsible for the introduction of many types of new protective and functional barriers and the machinery specialist has kept pace with the necessary equipment designed to be employed in the automatic wrapping of many kinds of products. The time is almost here when it may be said that there is a fully functional and protective wrapping for even the most delicate type of foodstuff. Packagers may always consult with the supplier of material and submit foodstuffs for test packaging as problems may be solved in this way for the general benefit of the trade as a whole. Many new protective papers have been produced as a result of the manufacturer's individual problems. Some types of packaging materials have to stand up to stresses and strains in processes of automatic packaging and such features as paper creasing, scoring, and adhesive application must be considered. Such matters are most important as tests prove that most foodstuffs retain their original flavour and desirable moisture best when packaged in airtight, moisture, gas and greaseproof papers which at the same time prevent the transfer of light. Where a product must 'breathe', the right type of wrapping must be used. Progress has been made in the retardation or prevention of mould growths by the use of the correct packaging materials, in conjunction with the application of germicidal gas to the pack prior to sealing or closure.

The Best Choice of Packaging Material.—Some important factors have to be taken into account when considering the most suitable packaging material for the product involved. Liquid, semi-solid, powders, solids in small or large sizes, soft solids such as fish, meats, and certain vegetables all require a suitable container be it glass, tinplate, waxed carton, film foil or barrier. The method of presentation of the product will have some regard not only to the type of product as outlined, but whether such factors as the complete impermeability to light, gas, odour, water, water-vapour, oil or grease, have to be taken into account. Often the method of packing or packaging by hand, semi-automatic or fully automatic machine method will have to be considered. The subject of acidity or alkalinity, possible damage in handling, storage or transit, conditions of climate, display or shelf life, temperatures, all have to be taken into account. Many Trade Associations recommend methods of packaging as in the case of the British Egg Marketing Board. In this case, it has relation to egg packing, number of eggs per case or container and methods of case closure by adhesive, gummed tape or staple fasteners.

Judging by the current displays of food and beverage products, most packaging problems have been solved, but there is always the new product or process of food production to consider and the ever increasing range of new barriers and functional papers which become available to the packager. To know the material and its application can have an important bearing upon successful packaging.

Some other factors which have to be taken into account when selecting a paper or board material for the package are the tensile, tearing and bursting strength of the wrapping, and in the case of a board, its folding qualities. The question of expansion and contraction of both paper and board can often be controlled by using mature paper and ensuring that conditions of storage are suitable. Damp, cold or hot paper storage can bring about either of these vexatious problems for the packager. Packaging material may often be supplied in a collapsed or folded form for the convenience of storage. Size, weight and dimension of paper and board may always be specified to the supplier. Materials may be supplied either plain, printed, embossed, varnished, cellulose finished as required; it will depend upon the product to be packaged, the facilities the packager has at his command and the form in which he packages the product. Some market research may be carried out even in a limited form to determine such factors as the after-use value of a container, appeal, size, shape, the number of portions per unit, the value of a pourer spout where this may apply as in the case of salt or powders, the method of closure and opening of the carton or canister, the colour scheme of the packager in relation to others in the same group by a packager, and above all, the product should display well in the shop window or store creating consumer appeal in every possible way ensuring constant and long displays of the product by the retailer.

Vegetable Packaging.—Various references to the materials used for packaging fresh vegetables are outlined in this book and there can be no doubt that this form of food packaging is gaining favour rapidly among both growers, packagers, retailers and public alike. Much work and research has been carried out relative to this form of packaging which offers cleaner and more attractive merchandise with less wastage and bulk. Often the storage and display life of the product may be increased by suitable packaging materials and methods. Both wrappings and fibreboard corrugated materials have been devised for such purposes. Fresh fruits are also similarly treated and are being chosen by the buying public as opposed to bulk displayed fruits. Often fruits are given to friends and in such cases, an attractive package renders the product twice as enticing. Cartons, window display boxes, nettings, and boats are now popularly used for such produce. Some kind of suitable film may be used to package fruits and when heatfixed or sealed with a brand label, some very attractive packs may be formed, the product itself being fully visible yet protected from dust. The cost of suitable containers or cartons must obviously have some relationship to the product and its price range and refinements of this kind may often only be used in the medium to expensive vegetable and fruit range.

Fresh Meat Packaging.—The self-service store and the supermarket have made it imperative that meat cuts, steaks, chops, chickens should be suitably packaged in order to preserve flavour, colour, freshness, display value and appeal up to the point of choice and sale. Most of the problems in all fields of fresh meat packaging have been overcome and

suitable waxed cartons, window cartons and filmic wrappings have been formulated for all purposes. The question of colour retention still exercises the minds of the experts, and is, in the main, controlled by suitable reducing agents. Poultry packaging in all its forms has been discussed in this book. Cooked meats and poultry are being packaged in suitable metal foil lined bags so that both flavour, grease and cooked conditions are taken into account.

Fresh Fish Packaging.—This is a developing field of packaging likely to be expanded in the near future. The whole success of this venture is first quality fish, efficiently packaged in the right medium, carefully handled and displayed under the correct temperatures relative to quick or moderately fast sale. Cellulose films, waxed cartons, wet strengthened krafts, parchments, are among the common material employed in processes of fresh fish packaging. The handling, carriage and displaying of fresh fish packed in ice with its attendant messy and unattractive appearance will be something of a memory one day.

Frozen Food Packaging.—Frozen food packaging is playing an ever increasing part in the presentation of foodstuffs of various kinds and with suitable display and store cabinets, there can be no doubt that this method of packaging has an appeal. Canned products are generally considered to be an economical process of food packaging and the displaying of the finished product does not involve special storage and display conditions. However, all of these problems may be met and overcome in the future. Frozen foods are largely packaged in waxed containers or cartons some with filmic windows which keep the product factory or farm fresh for limited periods. Peas, beans, meats, poultry, certain fruits, vegetables, are among the popular items of foodstuff packaged in this way and the range is ever widening.

The range of packaging materials available to the frozen food packagers also grows and some advice may be obtained from film, aluminium foil and alloy and waxed paper suppliers to ascertain which is the most suitable medium to use. Whatever medium is used it should be non-toxic and odour free; it should be pliable and easy to handle on packaging machinery. Heatfixing or sealing facilities are an advantage and this will provide impermeable and first class seams. Materials are also required to be waterproof with resistance to staining, particularly in the case of fish packaging. Most materials are printed for the purpose of sales appeal having food stability for display and handling but they must be easy to open up when required for use. Size and shape of carton may have to be considered with a view to ease of filling or display in suitable frozen food cabinets.

The composite container as already described in this book based on a card body with tinfoil ends can serve a useful purpose in this field of packaging. Waxed material is best used in conjunction with aluminium container ends.

Dairy Produce Packaging.—Functional and protective packaging papers are being used more and more in the packaging of cheese, cream, and milk although in the case

of the latter, glass bottles are still the most popular containers. Aluminium foil, laminates, alloys, heavy gauge films, waxed papers and board materials are among the most common barriers in use for general dairy products. They all have special functions in their respective fields, being printable, mouldable, flexible, durable, odour free and non-toxic among other properties. Specially coated films with surface wax and other compositions are proving very satisfactory for such purposes. The requirements of hygiene have to be considered but the day may come when milk and allied products may be largely packaged in paper based functional and protective packaging materials. Both fibre-board and corrugated material are used with suitable protective liners in the case of bulk product packing and some of these materials are replacing wood. In the case of butter both plain and waxed parchments are used while well-printed aluminium foil wrappings are steadily gaining favour.

Genuine Vegetable Parchment

The outstanding merits of genuine V.P. must not be forgotten although this packaging material is among the oldest established mediums in use today. Current grades have been considerably improved by British paper makers and have greater strength, in either wet or dry state, and absolute greaseproofness. The fact that greaseproof or V.P. are tasteless and odourless commended them to the food packager for a reliable and inexpensive food wrapping. They are readily printable in colour, easy to use and handle by all methods of packaging. Obtainable in sheets, reels and rolls, there is also a wide range of ready-to-use paper bags and box liners ready for filling or application. A type of genuine V.P. is specially suitable for deep freeze poultry packaging. It may also be obtained in shredded form and, in this way, makes a first class cushioning material, assisting in the prevention of bruising of meats and poultry in transit and handling in general. Medium and large poultry packagers may carry out their own shredding of V.P. or greaseproof on their own premises as the machines now available for such work are relatively inexpensive and easy to operate without any special instructions. With eviscerated poultry, giblets may also be wrapped in genuine V.P. and placed neatly in the body cavity. Heads are also improved when wrapped and the general presentation made to protect the display against the leakage of blood and moisture. The latest type of genuine V.P. made up into bag form in various sizes may also be used for the actual roasting of the bird by the purchaser. It must be emphasized that ordinary grades of parchment and greaseproof do not serve the functions outlined. Current treatment of the best grades of greaseproof and parchments render them impervious to air, moisture, fat or oil and are, in some cases, much stronger when wet than dry. Such papers may also be treated by the paper maker with glycerine as a plasticiser, grape sugar or some other hygroscopic substance in order to render the finished paper pliable. There are imitation parchments and such grades are made without suitable treatment as outlined, but they have a certain toughness for general food wrapping. Other papers in this group may be made

transparent, waterproof, airtight, greaseproof, gas proof and fireproof and the general purpose for such wrappings is to prevent any product packaged therein from losing natural moisture in the product, absorbing outside moisture, or losing smell or flavour. Waxed coated papers and boards are used for packaging foodstuffs. Certain preparations and foodstuffs are susceptible to oxidation and in circumstances where the addition of an anti-oxidant is not a possibility, vacuum packaging with an inert gas is required and some knowledge of the gas transmission rate of any paper may be desirable.

The important properties outlined for genuine V.P. are accepted as a barrier to the depredations of bacteria. The possible effect of light in starting rancidity in fats and oils and their derivatives may have to be taken into account.

Liners or laminates of polythene films render a material greaseproof, vapour-proof and waterproof while other laminates reject the entry of light into packaged products.

Glassine

Glassine, vegetable parchment and greaseproof are not affected by grease and oils which will quickly penetrate ordinary grades of paper. In the process of manufacture, a greaseproof paper is re-moistened, or re-wetted as it is termed in the paper mill, and subjected to a heavy polishing or supercalendering process while the paper is still in the wet state and, in this way, much of the fibrous furnish of the paper is further broken down thus producing a transparent sheet called glassine which is often more grease-resistant than the initial treated sheet of greaseproof paper. Parchmentizing of such paper provides the sheet with good strength and this is retained in a wet condition, a low air permeability and a very good degree of chemical purity. The various papers in this group, therefore, are ideal for the packaging of wet or greasy foodstuffs, fruits, meats, butter, vegetables, fats of all kinds, fish and ice cream. The various papers should be tested so that the best results may be determined. Glassine and greaseproof have similar qualities to vegetable parchment except for their wet strength properties, and this is somewhat lower. The fact that glassine is transparent renders it suitable for window packs, satchels, wallets and envelopes with a window. All of these papers have identical chemical purity. All of these papers too, are supplied in sheets, reels, rolls and coils to specification and may be obtained cut as box and case liners. Suitable machines are made for dispensing the material in reel form and many good types of counter roll holders are available for the medium sized packager and the retailer.

The paper maker is constantly improving qualities, strength, colour and other properties of all these important wrapping materials. The initial treatment of the fibre used in paper making, the process of parchmentizing are some matters which receive the earnest attention of the expert. Research continues not only in the improvement of established wrapping papers but in the formulation of new barriers and much of this work is aided by packager's own individual problems sent in to the specialist for solution. The porous structure of papers and in particular the vegetable parchment groups is constantly under review.

Waxed Papers and Boards

Tissues, parchments, glassine and board material are the usual basic material coated with wax either by the hot or cold process. Twisting paper is a wrapping that is used as a base for waxing on one or two sides and used to wrap confectionery and some kinds of food items. The film of wax has no strength so that the essential pull and stretch where wrapping is concerned, must be incorporated in the basic paper to give it the necessary tension. Such papers may be subjected to considerable torsion in packaging and wrapping operations. Waxing tissue is thin but strong and 18 in. × 23 in., 5 lb., is a normal weight for this grade of tissue. Basic paper should be without any kind of markings such as specks or spots and free from pinholes. Basic papers are unsized so that they may absorb small quantities of the wax. Sizing of base papers has a relationship to surface coatings which follow and may be soft, semi, medium or hard sized as required. In order to provide waxed papers with a good bright surface, they are subjected to suitable calendering and some are machine glazed. This process also closes up the waxed paper surface thus making it even more suitable as a food wrapper. The surface finish may be applied one or two sides calendering producing a two-sided polish and the machine glazing process a one-sided finish.

Waxed parchments and glassines are used for packaging and wrapping foodstuffs, and in recent years, many brands of bread are being wrapped in well-printed waxed papers of suitable substance. Waxed board is largely employed in the packaging of honey and jams and is also used for milk bottle seals. Basic papers of all kinds may be printed in colour and this is carried out before the waxing process. At the same time, tissue and parchments may be embossed lightly or marked by passing through embossing rollers with a steel engraved pattern. These type of waxed papers come within the range of signature papers and are used for packaging all kinds of products needing a protective barrier from moisture. Such strong and good substance papers as krafts and sulphites when waxed are also used for packaging purposes and provide a strong and waterproof barrier to many kinds of heavier substance products.

Some of the everyday products now popularly wrapped in some form of waxed paper or board material are cakes, biscuits, meats, cut sandwiches, delicatessen items, frozen foods, cheese, butter, dehydrated foods among other foodstuffs. Where protection from outside moisture is desired or absolute dryness, such papers provide first class foodstuff wrappings.

The aniline process of printing is popularly used for printing bread wraps, bags, wallets and other forms of sheet wrappings. Bright colours and good designs are possible so that the package may incorporate brand name with the necessary sales appeal. Waxed papers afford the packager publicity value and ample protection for the product. Either waxed coated or wax impregnated paper and board may be produced and either quality is made according to the method of treatment. Wax may be coated on to the surface of the basic material and this renders the finish of the material slightly uneven as a surface coating.



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Wax impregnation is a process where the wax is forced into the fibres of the base material and this results in a comparatively smooth surface finish. Tasteless and odourless paraffin wax is used for surface coating while microcrystalline waxes are also used. These two waxes are very widely used by the paper converter for the waterproofing and water-vapour-proofing of basic paper, and board. Both are economical and are not difficult to apply and give good results from the packaging standpoint. Obviously each grade has both its advantages and disadvantages but combinations of both form a coating or impregnating recipe which will result in the desirable properties of both. Other additives may be used in each grade of coating in order to modify the initial qualities. Paraffin wax gives a white wrapping, an unmistakable hardness with high gloss surface. Such coatings may be brittle with poor ageing qualities at high temperatures which may lower grease or fat resistance.

Microcrystalline wax provides greater ductility for a wide range of temperatures and this quality makes it a first class wrapping material for quick frozen foods. It is also tacky rendering it suitable for lamination. It has a greater resistance to grease and fats and higher viscosities in the molten state for high wax loads. It ages well at varying temperatures and has good stability. It has not the brightness in colour of paraffin wax but this does not interfere with its application or its usage as a box and packaging case inner liner. Whatever formulae is used for coating or impregnating, the base paper is most important and it is generally accepted that waxes themselves, do not make a paper greaseproof. However, from the standpoint of food packaging, microcrystalline waxes impart greater greaseproof qualities to a paper than is the case with paraffin wax. The paper converter is able to render a waxed paper or board heatsealing, by certain resin additives. Other added ingredients will provide tensile strength, good handle, melting facilities for sealing, high gloss and surface finish, complete opacity and a certain slipperiness which may be desirable for ease of handling in wrapping or working on automatic packaging machines.

Heatsealing waxed paper is used in connection with bread wrapping and the wrapper or printed band is self sealing. Heat and pressure are applied until the wrapper or band is fixed in position. The wax solidifies and where a really fast closure is desired, heatsealing wax papers should be used. The surface wax film should be of suitable thickness relative to the finish of the paper itself. A good surface coating is desirable and one that will not penetrate the basic paper is essential. This is all taken care of by applying wax coatings to suitable basic papers with a finish that will either partially resist or permit a certain degree of wax coating or penetration.

Dry Waxing.—In this process, wax impregnates the basic material, paper or board without leaving behind a surface coating. There are various methods of wax application whereby the web or paper is passed through a bath of wax, rolls transferring the requisite amount of wax to the paper.

Wet Waxing.—In this alternative process, the wax is applied to one or both sides of the surface of the basic material in

a continuous film. In the case of one-sided coating, the process is similar to that of dry waxing, the mixture being applied to paper or board surface by roller in controlled quantities. By passing the sheet around the chill rolls of the coating machine, penetration of wax is prevented thus keeping the film on the surface of the paper. Brass rolls provide the ultimate finish to paper coated surface. Current qualities of waxed papers, plain or printed, hot melt coated or laminated to some other material are now used for packaging high class food products and work well on modern high speed automatic packaging machines. Both flexible basic papers and coatings assist in pleating or creasing processes often carried out in wrapping the product.

Waxing Cartridges.—Suitable cartridge body paper, furnished with 100 per cent highly bleached sulphite to which titanium dioxide has been added in order to maintain a high degree of whiteness after the waxing process, is used in the production of high class waxed material for the manufacture of ice cream cartons, milk containers, drinking cups and containers for frozen foods. The final make up is strong and rigid with a good and even surface for colour printing and the degree of whiteness is the highest possible. The majority of cartons are waxed after forming and are therefore produced in much the same way as the ordinary carton being printed, cut to shape and creased in the flat sheet formed to the desired shape and then waxed. At the same time, waxing may follow the cutting and creasing operation but this will depend upon style of carton. In the main, cylindrical and tall rectangular cartons are waxed after forming while shallow box shaped types are treated in the sheet. Suitable inks are used in order to prevent any run of colour when the cartons are immersed in the hot wax mix.

In the case of pre-formed cartons, these are first dipped in the bath of wax at a temperature of some 190°F., and then left to cool off. While both sides are wax coated, there are processes whereby one side only is waxed. A high gloss may be obtained by passing the carton through a spray of cold water. Wax impregnated cartons are produced in much the same manner except that their immersion lasts a little longer to permit wax impregnation.

Cooling in this case is gradual to permit good penetration of the basic material used in the make up of the carton. Spraying is yet another process but the ultimate aim in all processes is to produce a first class waterproof container or wrapping.

New Tea Waxed Pack.—A first class wax impregnated box has been produced for the packaging of tea in one pound and half pound cartons for the home and export retail markets. The new pack is original and ensures long life of the packaged tea in extremes of temperature from the very dry to humid conditions. The ordinary paper pack was found in such instances to 'go flat' or 'paperise' as it is described in the tea trade. However high the demand, the shelf life could not be determined and from the time the tea left the stores, storage and freight delays could not be accurately governed. The new first class sterilized pack with specific house colours was constructed as a shoulder box in wax impregnated Norwegian sulphite board, printed with

two letterpress printings in black and an attractive gold. The boxes have an interesting feature in a small tray, in the same wax impregnated board which fits into the carton preventing any of the tea leaves from working up and then down through the lid and over the shoulder, under the cellulose film wrapper. The boxes were cleverly devised so that one size of carton will suit different brands of tea, in fact four cartons can take a variety of blends in pounds and half pounds, as one type of leaf tea will occupy less or more bulk than another. The special wax formula prepared by the Pearlite Box Co., ensures that not only is the carton moistureproof, but it is also odour-proof so that if it is stored near any other type of strong scented commodities, the tea inside the package is not affected. At the same time, a new pack complementary to the larger one, loose tea boxes and the same wax impregnated board, was designed for Carwardine 'Tea-lets' fine Ceylon fannings packed in infusion tea bag material subjected to their 'Flav-o-rite' process. Further notes of waxed materials, cartons, etc., are to be found in Chapter 1.

Cast Coated Papers

These fine bright high gloss coated papers, made in several substances as paper, cover and board material are now available plain, coated, gummed and heat fix treated. They are used as wrappings and for label work. Made and branded under various trade names, they were originally made in the U.S.A., Canada, Germany and now in Great Britain. Cast coated papers may be printed with ink specially prepared for their high gloss surface as they are somewhat different from the conventional type of coated paper and board stock. The outstanding surface finish does require some slight alteration on the printing press and in normal printing techniques if the full value of the material is to be realized. These papers are used as product wrappers and packaging papers, box lining material and for showcards, covers for price lists and catalogues, printed labels and brand seals of all kinds, in fact any packaging operation where a high class product is being dealt with. It is available in standard sizes in both paper and board weights.

This new coated paper obviates the necessity of after-treatment to the printed work such as nitrocellulose, lacquer or varnish as the brilliant surface effects equal these additional treatments to paper surface. The basic paper and board grades have plenty of 'cushion' thus making it easy for the printer to get first class results on the press. The traditional clay coated papers and boards are produced as a result of applying a coating mixture of clay and adhesive one or both sides of the web on the coating machine. After coating is applied, such paper is re-reeled and polished on the calender stack in various degrees of finish. Applied calender pressure to the web of coated paper provides a smooth, even and glossy finish associated with art, chromo or coated paper. Such papers are used for printed book work, book jackets and general printing but apart from chromo papers, art papers are not generally used for packaging or wrapping. On the other hand, the more recent cast coated papers and boards are produced in another way, and a rather different type of basic paper is used, the stock being kept flat. Body

paper is treated by casting drums where, by means of a new technique, a layer of coating is applied to the base paper, after which, the coated paper is dried in contact with the surface of the highly polished drum. It finally comes off the drum with a high rich gloss surface now associated with cast coated papers. The finished paper requires no further treatment in order to give the paper added finish, therefore a good white sheet is obtained and there is less tendency for mottling as may be present in the other varieties of coated paper. The glossy surface is also softer and bulkier than regular coated paper and it is claimed that as 60 lb. cast coated paper will bulk equivalent to between 65/70 lb. of a regular litho grade. Most cast coated papers will print well by all the processes of printing, the relatively absorbent characteristic of the paper obviates the need for squeeze to force the printing ink into paper surface. Half tone blocks used in letterpress process of printing are recommended up to 120 to 150 screen.

As mentioned, varnishing over cast coated paper by either spirit or other varnish is not recommended, the newer alkali resin varnishes being very satisfactory. Good results may be obtained by either hot or cold embossing, though hot embossing gives the best effects. Plastic-like finishes are obtainable thus rendering such papers ideal for gift box tops, high class signature papers for packaging, labels and embossed cameos, etc. For some years, cast coated papers have been used in the home and overseas markets for packaging and labelling operations. Bottle and can labels in the food and confectionery and beverage trades have reached a high peak of perfection and underline the application of this type of coated paper.

Friction Glazed Papers

Friction glazing is a method of imparting to coated paper a hard and brilliant surface with more than the normal degree of polish. Flint papers, Imitation Gelatines, Steel Blue Papers and Friction Glazed papers are examples of the types of wrapping and packaging papers produced by friction glazing. The rubbing or friction of rollers or burnishers revolving at different speeds provides the high finish to coated papers associated with these one sided wrappings. Made in white and several bright colours they may be obtained in the flat sheet or on reels for box making and lining. Foodstuffs and slab chocolate are popularly wrapped in various types of Friction Glazed papers which print well by the lithographic and letterpress processes of printing often with metallic ink or gold incorporated in the design. They are hard surfaced, finger proof, non-marking and waterproof, dustproof and hygienic and therefore make a first class and durable packaging medium for foods and allied products. They may be obtained gummed and heatfix coated for labelling, sealing and coding. Friction glazed papers are made in various grades, some are twice coated on the machine in the web before the final friction glazing takes place. The degree of glazing is determined by additional applications of rolling, thus rendering the paper higher in gloss or polish.

The basic body paper used in such papers must be smooth and even in surface so that it takes up a good coating and

reacts well to friction glazing. Such base papers are suitably sized to hold the coating recipe and should be sufficiently strong to stand two treatments, i.e. coating and finishing. In the main, there is only tension on the finished sheet in wrapping processes, most of these papers are usually lined or pasted to boxboard or strawboard in the process of box making. There are also flint or friction glazed boards and these may be used for display units or outers, showcards and general display work. They take up embossing well and where a decorative box paper is desired with good wearing qualities, there is much to commend such materials to the packager.

Fibre-Glass Reinforced Polythene

This relatively new material is being used as a protective wrap and is a combination of a two-ply open mesh made of fibre-glass yarns in conjunction with a heavy coated polythene film which provides a first class wrapping material with some outstanding features, namely product visibility and protective moistureproof barrier qualities. Wide

possibilities are claimed for this material which is extremely tough, strong and tear resistant. It may be used as an overall wrap for covering machinery and equipment put up on pallets or stillages, providing full waterproofing facilities for consignments which may come into contact with the open air. It may also be made up into heatseal sacks or bags and with its extreme toughness will be suitable for re-usage or for holding packed materials or products in storage over long periods.

In the United States, this reinforced polythene is being fabricated into heavy duty sacks and used for vegetables such as carrots and other root crops, again being capable of standing up to long journeys, rough handling and exposure. A hundredweight sack appears to be the standard and growers are said to favour the use of sacks made from this material for small fine grade carrots which are specially trimmed and cleaned and often eaten as an alternative to dessert apples. Obviously bags and sacks made from this material have a ready application for powders, granulated materials, etc.



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CHAPTER 6

Printed Label and Box Top Surface Treatment

THERE are several important processes of paper and board surface treatment which may be applied before or after printing for various purposes. Various forms of lacquering, cellulose treatment and varnishing adds lustre to the work of the printer. In principle, the current treatments available are both similar in processing and after effect to the fine smooth and glossy cellulose finishes used so extensively in many industries, in particular, the furniture and motor trades. Many of these paper surface treatments such as varnishing, cellulose and nitrocellulose coatings or lacquers not only further enhance the printer's art, but render label and box top work resistant to finger marks, dirt, grease and moisture. The outstanding waterproofing qualities of such surface treatments to printed paper are remarkable in their appearance and durability. Where labelled products are frequently handled or displayed in the self service stores or on the supermarket, the appeal of the lacquered printed label can be very impelling to the shopper. Where goods are displayed and sold under conditions of atmospheric moisture, actual contact and proximity to damp surface such as may prevail in the open market, some kind of finish or varnish surface to printed work of all kinds is recommended. Cellulose and various kinds of filmic laminates form a hard yet flexible surface which folds without cracking and has the outstanding and valuable effect of stiffening the sheet on which such treatment may be imposed. Furthermore, such surface coatings and laminates do not suffer from scuff or abrasion where two surfaces are rubbed together and the wear resisting qualities of a paper or board are considerably improved. Some important uses of paper surface treatments are for carton and box work, labels of all kinds for cans, glass containers, boxes, containers, cartons and waxed cases of all kinds, wrappers and packaging papers to mention a few of the materials which can considerably benefit by some kind of application of protective coating. Some outstanding examples of printed paper surface lustre are to be found in the book jacket production and disc or record holder fields where the applied surface coatings or laminates not only render the work more durable, but most outstanding with eye appeal.

Various treatments are surveyed in this chapter but the all important feature of such after printing treatment is the basic paper used by the printer or the packager. The most suitable paper or board material to use for the label or the box top where surface treatment of some kind is under consideration is that which is suitably sized so that any varnish or cellulose penetration into paper surface or body

is overcome. Hard sized papers and boards, preferably clay chromo papers or coated papers are best but some advice may always be sought and obtained by the printer from the paper merchant or supplier, paper samples being subjected to actual tests.

Application of Coating to Printed Work

Canned foods and medium to high class bottled beverages often carry a label which has been surface treated by varnish, cellulose, nitrocellulose or some protective surface lacquer. There is no mistaking the high gloss and rich lustre of the label thus treated which, as a result, has been rendered dustproof, finger-proof and moistureproof. These treatments are an advancement upon the more established forms of spirit varnishing which may also be considered as a temporary coating to the printed job as such treatment tends to rub away fairly easily upon frequent handling of the product and, furthermore, fades in the sun when exposed in the shop window or store to normal conditions of sunlight. Spirit varnishing is not resistant to oils or solvents, while on the other hand, nitrocellulose coatings have neither of these failings.

Where bottled or canned goods are likely to come into contact with other products which could spill on to the label, such a condition would be detrimental to the varnished labelled product. Cellulose treated labels or material may be transported in safety without the likelihood of such problems arising and without the danger of scuffing. There can be no doubt that treatments based on lacquers and cellulose in connection with the printed surface of paper have reached a new and high peak of perfection the finished label or printed piece being durable, attractive and fully protected from all the hazards likely to be met in the transport and displayed life of the product. Other types of surface lacquers based on new and proven formulae and suitably applied or coated on to paper and board material provide a first class selling aid for the product in the whole of the packaging field. Such papers of like weight or substance, aluminium foils and films may be surface protected by various other types of lacquers. Some additional structural strength may be added to such types of wrappings and packaging materials rendering them flexible, durable, resistant to grease or water vapour, and washable with the additional advantage of being non-blocking in handling or usage. Other types of lacquers impart heat-sealing qualities to a paper.

Paper itself and the actual packaging lacquers, contain three basic components: a film former, a resin and a

plasticizer. The film former provides the strength and tear resistance to burst and breaking strength and the resin provides the adhesion to bond the coating on to the paper or other basic material so treated, it also contributes other important properties which include body and gloss. The all important plasticizer is added as a means of controlling, within prescribed limits, the desirable flexibility of the coating. The essential balance is taken into account so that the ultimate needs of the packager and his material are fully considered. Whatever form of lacquer, cellulose or varnishing treatment, applied to printed or plain paper packaging material, the ultimate usage is taken into account.

The greatest strides in lacquer and paper surface coatings have been in the field of labels or paper freedom from tackiness or any kind of blocking tendency. Paper surfaces so treated are fully flexible, grease resistant, abrasion proof, glossy and resistant to the passage of water. Other lacquering surface treatments for wrappings and packaging papers render them heat sealable yet maintaining the desirable colour or tone of the paper on to which they are imposed. The importance of the surface treatment for paper has a relationship to the ultimate use of the material and here some advice should always be sought. In this chapter we are not so much concerned with lacquers applied to films, foils and laminates, paperboard and other packaging materials, but the various treatments available to the printer and the packager relative to his labels, box tops, end and brand labels, covers of price lists and catalogues, charts, and any other printed work which may be so treated to render it more durable and waterproof and eye appealing.

The New Supergloss Finish

A new waterproof, flexible, non-scuffing, non-finger-marking high gloss finish has been perfected in recent months whereby printed paper and board material may be treated to a remarkable degree of protective surface finish. This treatment brings out the colours of printing inks in much richer tones than other finishes rendering the printed paper flexible, foldable and non-crackable. This treatment has a special application for printed boards, showcards, display units, high class cartons and for label and box top work for quality labelling and lining work. The process is one of a cellulose application to the printed sheet in the flat and the material, thus coated, is passed through a rolling machine or between sheets of highly polished metal or chromium coated plates. In this process, both friction and pressure are applied to the paper and a super high gloss or plate finish is obtained which is mirrorlike in appearance. Such a finish greatly enhances the colour in printed work coating it with a high gloss protective coating which may be handled without marking in any way. It is only by comparison before and after treatment that one is able to assess the degree of finish obtained in this new process.

In addition to can and bottle labels, box tops and high class wrappings, any printed work that may be used in the open air, as is the case with charts, maps, instruction sheets and cards, designs, drawings, this new high gloss finish will be found most useful in the protection of such printed work



Cookery book cover treated with cellulose finishing.

from grease, fats, oils, damp, moisture, finger marking and any other adverse conditions. Packagers issuing catalogues, price lists of their products which may have to stand up to considerable reference and handling, will find this treatment or some similar cellulose finish not only attractive but something which will render the job much more durable. In many ways, the new super gloss or plate finish now produced by the steel plate or the roller processes, after the initial cellulose coating is superior to types of laminates. As pointed out hard sized printing paper or board, chromos or enamel papers are best for the purpose.

Nitrocellulose Finishing

This is now an established coating process for printed work, the smooth and polished finish being applied by coating on the machine producing a glossy and waterproof finish which is again both eye appealing and non-finger-marking. Both printing and paper are made more durable with longer handling life. The finished treatment renders material non-scratching, fluff and flakeproof where two surfaces may be rubbed together. Most important of all, the finished colour of the coating is white and does not yellow with age as does some forms of paper surface varnishing.

The paper for such printed work is again a quality that

will stand surface treatment of this kind and such grades as varnishable litho printings, one sided clay chromo papers and boards, or hard sized printings are recommended. First class grades of chromo papers are made on basic papers produced from a high percentage of esparto grass fibre which give the ultimate sheet of paper a soft feel, good folding qualities so that creasing where this work is necessary will not cause cracking or paper surface. The base paper coupled with surface treatment, renders the paper very durable for lining and box covering purposes. The close knit surfaces of clay coated papers help in the kiss impression of both printer's type, blocks and ink reception and help to produce first class results which will stand up to additional nitrocellulose treatment very well. Where specified and most stock clay coated chromo and other varnishable papers and boards receive a good degree of sizing treatment so that the basic paper together with the coating, stand up to the following-on processes of surface treatment.

Varnishing by Machine and Hand

Varnishing processes are carried out both in the sheet and reel by hand and machine methods, such finishing giving the final touch to printed work. Varnishing has many qualities where a medium finishing for product labels is suitable. It helps to emphasize the beauty of printing inks and protects the printed label or other work upon which it is imposed against abrasion and damage by moisture and a good degree of handling. A spirit soluble varnish is normally used for work of this kind and sheets up to 36 in. \times 46 in. in size in the flat may be hand or machine coated. This treatment is popular for box tops, cover work, cartons, sweet and food wrappings and every kind of product and brand label. Here again hard sized printings and chromo papers are most effective and carry the varnish to the best advantage.

A coating of varnish is often applied by the printer himself on the press or by some suitable attachment which provides a fine coating of varnish to the printed surface of the paper or board. There are naturally paper converter specialists who often collect and deliver printed work for such treatments. There is a specialist trade in this field of paper surface treatment which continues to serve the printers and the packaging industry with all kinds of surface treatments to paper including plate glazing, friction glazing, graining, embossing with a pattern or design and combination of both varnishing and graining, sometimes termed Oylin finish in view of its resemblance to an old master or oil painting effect. While spirit varnishing does not possess the high advantages of either the more recent super or high gloss finish, cellulose or nitrocellulose treatments, it has a place in packaging schemes where protective coatings may be required for medium quality printed work requiring a protective coating. Where durability is not important, varnishing can be the answer to the problem. In some cases, varnished work 'yellows' and some treated surfaces are inclined to crack, the sheet often creasing. At the same time, fluffing and scuffing can occur to the surfaces where two are rubbed together. The cost of this process is

naturally less than other treatments and this may be the chief consideration in some packaging projects.

Strip Varnishing

In addition to all over sheet varnishing of printed work, varnish may be applied to specification in strip form or position so that a plain strip of paper is available for adhesive fixing or closing. Before the development of strip varnishing processes, varnished cartons and can labels often presented some difficulty from the standpoint of label adhesion. The glueing of the flaps to their counterparts, for example, could only be effected after considerable trouble and the finished labelling results were never first class owing to the all-over varnish of the printed label preventing proper contact and adhesion. Machine strip varnishing overcomes this difficulty. Perhaps the term 'strip' is somewhat misleading as it refers to the *unvarnished* part of the sheet after treatment. The actual process is simple; the sheet is coated with spirit varnish while certain portions of the sheet are blanked out where indicated on printed sheets, such indications being the ultimate flap for fixing. The printer will so design the printed work making full allowance for blank portions of the job where varnish is not required.

Water Varnishing

This is yet another form of paper and board surface coating treatment and has a special application to the food packaging industry. The egg-shell finish imparted to the printed material helps in easy separation of printed work in labelling and sealing processes. It was in particular designed for playing card board as it imparts the required soft egg-shell finish to material. There are varying degrees of gloss but any of these will not be nearly so bright as those outlined above. Spirit varnishing and cellulose treatment are very bright and glossy in comparison. Water varnishing is often used for foodstuff labels of many kinds. It has no taste or odour and can really be described as a wholesome, hygienic wrapping or label for food packaging. Where



Book jacket treatment with varnish, shown printed in the flat sheet.

bronze or silver printing inks are used in printed work, water varnish prevents the ink from rubbing off surfaces and this is a very desirable feature of the process.

The smooth yet semi-flat finish is most attractive and for the best finished results good quality hard sized paper or board in the clay coated chromo series is best. Where such materials may come into contact with food, odourless water varnishing treatment is recommended and should be specified in this way. Water varnishing is applicable to printed work which must handle without finger marking and which must also be waterproof. Where the surface of the printed job, box, carton or label is not required bright with gloss or glare, water varnishing can be the answer.

Varnishing plus Graining

Any printed work on paper or board which has received an after treatment of some form of varnish or cellulose, may be additionally treated with a fine grain such as canvas, linen, hopsack, crash or hammer. All of these finishes are fine in character and not too pronounced in grain so that they will blend very well with a gloss finish often mellowing the surface finish. Graining may be applied to paper in the sheet and reel, the pattern being applied from either embossed rollers or sheets of actual fabric with the appropriate grains. Either applied to paper or board, impress the pattern into the sheet in any degree of depth required, depending upon the number of applications or pressure applied in the process. There are many fine grains from which a choice of pattern may be made. The combination of the two treatments give the printed sheet an 'old master' effect or oil painting finish which is most refined and eye appealing. This combined treatment is ideal for box tops and high class food and beverage bottle or can labels. Processes of graining will also mask minor defects in the paper which may be present as a result of imperfect stock or some slight fault in the printing. Used in conjunction with varnishing treatments, graining will help to break down hardness or rattle in a paper rendering the material more flexible where this may be desired. Paper and board may be grained either before or after printing. Graining should not be confused with embossing which is another somewhat similar surface process but one which invariably provides a heavy and larger design or pattern.

Paper Graining

Plain paper and board, white and tints, patterned and printed papers may be additionally treated with some kind of finish or graining as out-lined, most of the patterns in use being fine and mellow in appearance and include linen, crash, hopsack, crêpe, pebble, basquette and so forth either of which may be applied to paper in a determined depth or graining. Such grains are usually associated with letterheads, pamphlets, label work and box tops. In addition to adding appeal to the printed sheet, treatment of this kind is very valuable to packagers as a means of embellishing wrappings and packaging papers, including label and box tops and reducing light reflection. They make the printed surface softer in appearance and non-glaring. Once again, minor blemishes may be masked in either print or paper,

the tone of the job being generally improved. Graining is a process, as already described, obtained from metal rollers or sheets of fabric and may be applied to thin paper up to heavy weight boards. Heavy material often takes up the pattern much better. Any work treated in this way must be bone dry in the case of printed material as some damage may be caused to printed sheets which are partially dry. Fine grains are recommended for label work while the heavier series are best for board or carton work. Plate finishing or rolling is yet another treatment for paper and board and is employed as a means of improving the appearance or surface of a paper. Where a paper is too rough for printing or fine blocks, the surface may be closed up by suitable treatment on a rolling or plate glazing machine. Plate sinking is another process in this field of paper treatment.

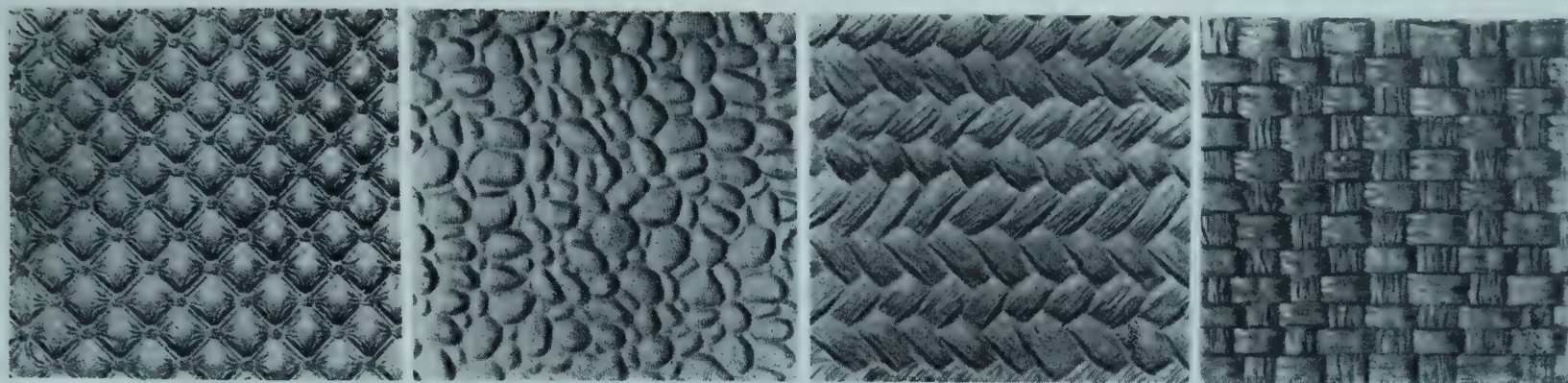
Sheet and Reel Gumming, Heatsealing, etc.

Many food and beverage packagers often require plain printed labels gummed in position or edge gummed for the purpose of label application to cans and bottles. Much of this work is carried out in conjunction with filling, labelling and packaging processes, but limited or small quantities for the special job may be required hand or machine gummed by a separate process. Hand gumming in position, as the name implies, is the work of dextrous operatives with many years experience of this type of adhesive application to label paper. The work also involves the gumming of window bills, sales announcements, labels, box tops, tipping the four corners of a strip on one or both sides of the bill for inside or outside the window application. There are other applications in this field of adhesive application by hand which is carried out by trade gummer specialists. Spot or patch gumming for cut out showcards, streamers, bread bands and the edge gumming of postal wrappers are other types of specialized work. Work may be suitably gummed one side and varnished the other. Where long runs of work are involved or more than one strip of gum is required on a sheet, the work is carried out by machine. Where labels are printed on plain paper, they may be suitably corner or edge gummed to order. Printed bands of many kinds are often printed on plain stock and afterwards gummed at edge for fixture purposes. Gumming either by hand or machine is much cleaner and simpler than paste and it is generally recommended that strip gumming of all kinds is best carried out after the paper has been printed. Trade gummers often keep standard widths of gumming bands available ready to fit into the machine so that the more popular widths are speedily carried out.

Other coatings used for wrapping, packaging and labelling such as heatfix recipes may be applied to packager's own paper in sheet or strip form and in the latter case, used for over-wrap on boxes and cartons.

Hints on Paper and After-treatment

The importance of a hard sized paper for most kinds of varnishing and cellulose surface treatments to printed work has been clearly emphasized. Hand or machine sizing may be carried out before varnishing but this adds to costs and



Heavy embossings for medium to heavy weight wrappings and box papers.

is never quite as satisfactory, such paper has a tendency to curl. Choose the paper or board with this in mind and send samples to the trade varnisher for testing as mentioned. Separately sized papers are inclined to curl and become difficult to feed into a machine in any following-on process. Hard sized printing, chromos, coated papers and boards are clearly indicated for such work. All of these grades are readily available from stockists in sheets of standard sizes and on the reel for machine packaging operations. All work must be sent in to the trade gummer, embosser, grainer or varnisher, absolutely bone dry or there will be some danger that the inks may be partially dissolved out by spirit varnish or the appearance of the work impaired by pressure. Sizes 36 in. \times 46 in. and 30 in. \times 40 in. in flat sheets are approximately the maximum handled by the trade for treatment but work is also carried out in the continuous web or reel. In the case of flat sheet printed work, allowance must be made for a gripper edge and the position of this must be determined for the purpose of sheet feed-in on the machine.

At present, some processes of filmic lamination could be perfected as some produce minor faults such as surface pinholes or small bubbles and the finished results can be disappointing. With progress, all forms of after surface

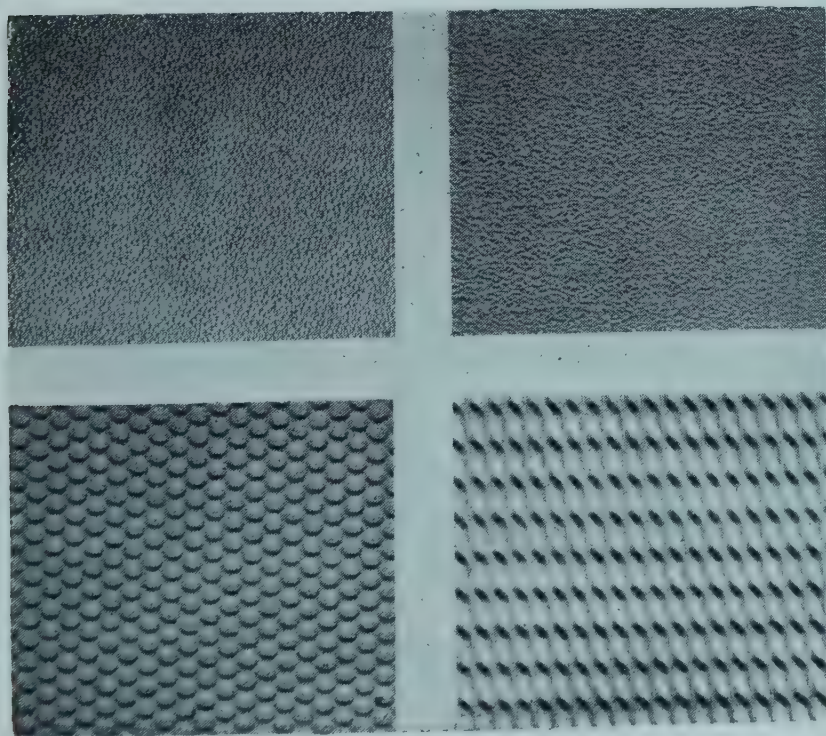
treatment will be perfected but often nitrocellulose will give the best results. There are other forms of lamination and these are separately discussed in this book. Boards are laminated with foil, metal lined, film, white enamels and chromo papers, fancy papers, coated surface and tinted enamel papers all used for some process of packaging and box making. Often a cheap middle is used where two materials are laminated both sides of a board. Corrugated materials are currently laminated with bitumenized cushioning and waterproofing materials, while kraft wrappings are laminated with metal, reflective thermal insulation metals and other barriers. Almost any material may be laminated in addition to being coated with some supporting paper and used for some special purpose and it is here that the packager may consult with the specialist and submit foods for special packaging investigation.

Embossing

Current paper and board embossing takes the form in many instances of the signature pattern where a packager's name, trade mark, emblem, trading slogan are produced in a suitable design or pattern, the ultimate embossing becoming the sole property of the packager. Such embossings may be used on wrappings, carton materials, labels, overwraps and for many other purposes. Even quite plain and inexpensive paper and board material may be attractively converted by the application of an embossing. Many types of stock fancy papers and wrappings are supported with some form of background embossing while other patterns may be chosen from the huge range of designs readily available with the trade embosser. Some designs are produced to commemorate some special occasion. Royal events and national exhibitions are often marked by some special embossing which may be used by many trades in conjunction with packaging gift and other products.

Among the popular embossings are moiré, watered silk, herringbone, diamond, seal, sandgrain a host of floral designs, etc., and these may be impressed into any paper or board, either plain or printed.

Recent embossing machinery now in use in this country embosses a pattern, prints a design in colour, tips where desired and generally converts the paper in a most attractive way either in the flat sheet or on the continuous reel. Steel engraved rollers are used for this work and changes of pattern are quickly carried out. Spanish lacquering, tipping, bruising or crushing, printing and embossing are carried out



Fine and heavy embossings suitable for box tops, fancy labels and packaging paper.

on other units as each process may be varied to requirement. The finished embossed papers may be used both for packaging or display purposes.

Food packagers and poultry farmers are now using wrappings with some kind of embossing appropriate to the wrapped product. The initial choice and application of pattern, unless it is specially designed, may be selected relative to its connection with the product itself. The possibilities of stock patterns may be studied with every advantage. Many individual designs have reference to some food product or its history and much the same may be said of beverages. Cocktail and other motifs embossed into a wrapping harmonize effectively with the bottled product and help to make it a more attractive unit when on display. As mentioned, large packagers of food and beverages of all kinds may have individual motifs and patterns. The steel roller on which the pattern is engraved will impress the motif, the pattern being reproduced between this roll and a matrix which may at the same time be combined with a colour printing device giving several colours where desired, leaving the relief portions unprinted or otherwise.

Paper Surface

All of these surface treatments to paper and board material before or after printing are the function of the paper converter, trade varnisher, gummer, embosser or

paper processor. These surface operations are quite different from the normal finish given to paper stock by the paper maker in the process of manufacture in the mills. Paper and board surface are important to the printer and the degree of finish has relationship to the process of printing. Paper surface finish is applied via the supercalendering machine and the degree of finish may be varied from light S.C. (supercalendered finish) to highly finished or even friction glazing. In general, paper and board finish is specified at the time of paper requisition. The amount of finish given to a paper varies from antique (unfinished) to highly S.C. and between these two extremes, many variations are available such as antique slightly calendered, low mill finish, the smooth surface associated with printings, imitation art surfaces produced as a result of water finishing or spraying. All of these surfaces are produced to assist in ink coverage by the printer and the higher finishes assist in the reproduction of fine half tone blocks and colour printing in the letterpress process of printing. When printed, clay coated papers, popularly used as food and confectionery wrappings, afford the printer the best opportunity of reproducing fine colour designs and assist in both after treatment in the form of varnishing or embossing. The initial degree of finish given to paper stock is invariably decided by the printer or paper converter who is able to estimate the best surface finish for the job.



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CHAPTER 7

Display Outers, Box Making and Display Materials

BOTH food and beverage packagers use the display outer for the purpose of attractively displaying the unit product on the counter, in the shop window and in the large stores where many eye appealing units may be seen. Bottled drinks are being put up in many novel types of carrier handle display outer units so that a suitable number of units may be displayed, demonstrated by the retailer and carried away safely and conveniently by the purchaser. Beverage outers of this kind are strong and attractive and being printed in colour with design and message, they can work for the packager as a travelling salesman. A vast industry has grown up around this form of product presentation unit and skilled artists now specialize in the design and format of the most suitable type of outer for the product. The growth of this industry has been rapid, the materials used being varied and chosen for some special purpose such as strength, colour, surface for printing, flexibility for folding and scoring. The production of these display outers, particularly where quantities are concerned, can be an economical proposition and greatly assists the retailer who formerly received goods in bulk and repacked or presented the product in the best manner he was able. With the desire to render quick service, however, retailer repacking has become impracticable.

Many brands and product names are immediately recognized by the form of display or the method of presentation. It may be colour, shape, style and general presentation, but once a good style has been well received by the retail trade and the buying public, any change or re-styling to suit new containers or units so packaged should be gradual so that much of the former accepted presentation is retained. This will naturally apply to the established all-the-year-round type of display outer, but changes may be effected in the form of seasonal or gift display units or outers. The question of change of design where display units and outers are exported needs important consideration as where display matter is printed or designed to a regular pattern, overseas buyers may conclude that the product too has been changed in quality or volume.

The box making trades are well able to produce whatever is required in design, novelty, after-use appeal, material, colour or style of both the unit carton or pack and the display outer itself. The materials now available offer every scope in design and shape, stability and durability, the finished outers being delivered to the packager flat or collapsed for convenience of storage until actually required for filling. Styles are wide and varied in method of make up and general presentation and most types of display outers

can only be designed or evolved as a result of contact with a specialist together with a number and kind of unit products to be so packaged for experiment. The outer is tailormade to suit the product and the number to be displayed. Anything from the simple to the colourful eyepiece is possible; it will depend upon economics of the product, the market and the product itself. In every case, however simple the unit, the main object is to catch the eye of the retailer who will be thus persuaded to give frequent and long displays to the merchandise in his shop window and at the same time to create appeal among the consumer. Display outers are made from a single piece of suitable board material which has been cut out and suitably creased for moulding and folding the outer into shape for filling. Flaps, slots or slits are incorporated in the make up to permit a degree of



A Clarifoil window to aid display and a lid for protection in the shopping basket. This grape box was made by Reed Cartons Ltd.



Four new display outers for the Atora $\frac{1}{4}$ lb. packs of shredded beef suet. Designed by Richard Lonsdale-Hands for Hugon, made by Reed Cartons Ltd.

rigidity while on display. Many display outers are made up from two-pieces of material being glued or wire stitched into position. In this type, the construction is the main body portion and a band which joins the two pieces together. For first class display and visibility of product, outer lids should be large so that when folded or locked back, the complete contents of the box are on view. Novel or plain cut-out windows in the fore of the outer are often incorporated to permit of maximum view of product or unit. There are one-piece display outers with rim extensions made to fold in, thus forming a double wall on three sides. Side extensions with tuck in flaps are made in various styles according to overall volume of packaged contents. There is, in fact, nothing beyond the scope of the skilled



Display unit for Nescafe.

designer and box maker, the designs being worked out on a decorative but practical basis.

There has been considerable development upon former types of machinery used for this work and current equipment will mass produce boxes, cartons and outers from the continuous web or reel of board material. They may be printed in full colour stamping out the template box, fold, shape, mould and fasten seams with adhesive, render the box collapsed ready for bulk packing and despatch or storage. (Further notes on box making are to be found in Chapter 1).

Display Outer Types

The search for new and novel construction goes on and a variety of strutted and tilting display outers and boxes are produced which give first class display facilities, the box being tilted forward in order to afford a more outstanding view of the displayed piece. Often novelty and appeal may be incorporated into a display outer without adding cost to production apart from the additional material required which can be taken into account at the onset but where additional fitments are used to serve the purpose of setting off the display to better advantage, this adds to labour and material and naturally increases the cost. Such ideas can be produced by the box maker specialist but they are best reserved for the high class or gift type of food product. Often, however, some folding 'legs' at the base of a display outer can serve the purpose of tilting and sometimes the lids may be arranged to fold back giving a more interesting display.

Several new types of display outers are illustrated in this chapter covering a wide range of ideas. Most of these outers are simple to fill and are quickly fashioned and made up by the retailer for display. As already mentioned, specialist box makers hold patents for various types of box shapes and outer designs which have functional value for certain groups of products and packagers may well take advantage of proven patterns and outer ideas, converted to their own needs.

The Three-way Band Box.—Simple in construction, this



Two attractive soup pack display outers.



Above: A beverage display unit.

Left: Display outer for salted peanuts.

type of outer consists of one piece of board punched out or cut to the height of the completed box and at the same time sufficiently long to surround three sides of the outer or container. There is a narrow flap at the ends of this piece for the purpose of glueing or stitching the other piece of board which has been prepared to serve the purpose in shape and size of the lid, back and base of the completed container. This is one of the most popular types of outers produced.

The Four-Way Band Type.—This type is somewhat similar, additional strength being given to the box by extending the band along the fourth side and in this case, only one wire stitching is needed. The completed band is fixed in position either by glue or stitches to the body of the box. In each case, the panels at the side of the outer can be extended over and above the height of the completed container such extensions being creased to fold and form a rim.

Whatever the form or type of display outer, it can only be part of a much wider retail display and has therefore to

compete with others equally attractive and eye impelling. However, a good brand name sells again and again, the method of presentation of display serving as a constant reminder to the buying public.

Display Outer Materials

Folding Box Boards.—There are various types of plain, lined and coated folding box board made for the purpose of box, carton, display outer and similar unit manufacture. The description may be taken quite literally as most good grades of folding box board can be scored and folded without cracking. Flexibility, strength and lightness of weight are also important features of the box board.

White Lined Folding Box Boards.—Both British and overseas grades are used in the box making industry, the country of origin being stamped upon the package. Some grades in this type of board are pure and some have a percentage of mechanical wood in their fibrous content. There are chip boards with grey backs and other grades are either semi-bleached or fully bleached. Some boards may be specified with coloured linings, the large consumer being able to obtain specified colours. Material is used either in the flat sheet or on the reel and is made in various calipers or thicknesses. Lined surfaces will print well, litho processes of printing being among the popular style of printing in colour.



Another attractive display piece for soft drinks.

Coated Folding Box Boards.—These are good quality basic boards made in white and colours coated in the converter mill on the reel and either used from the reel or cut to sheet to specification. Coating gives the board a smooth clay coated surface which is most attractive and suitable for the reproduction of fine colour half tone printing, among other processes. The caliper of these boards is usually between 0.012 to 0.035 making up small, medium to large size cartons, containers, display units and similar work of fine quality. This grade of board scores and folds extraordinarily well and makes up durable and attractive containers of all kinds.

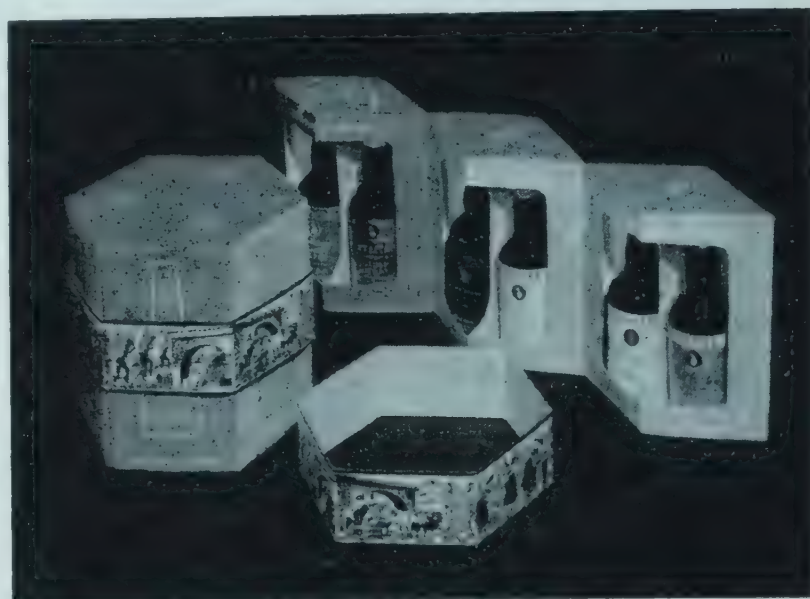
Other boards used in box making processes vary from Dutch and British strawboard, enamel lined or coated boards, double-lined boards, paste boards with folding properties, coated and lined metal folding box board, this latter series being used for high class, gift and seasonal types of packaging.

Board Application and Box Manufacture

In these days of ever-increasing costs, the importance of avoiding waste is of paramount importance so that the choice of size of all raw materials used in the packaging



Above: a novel Perrier display unit, and below: a smart display case for the presentation of gift beverages.



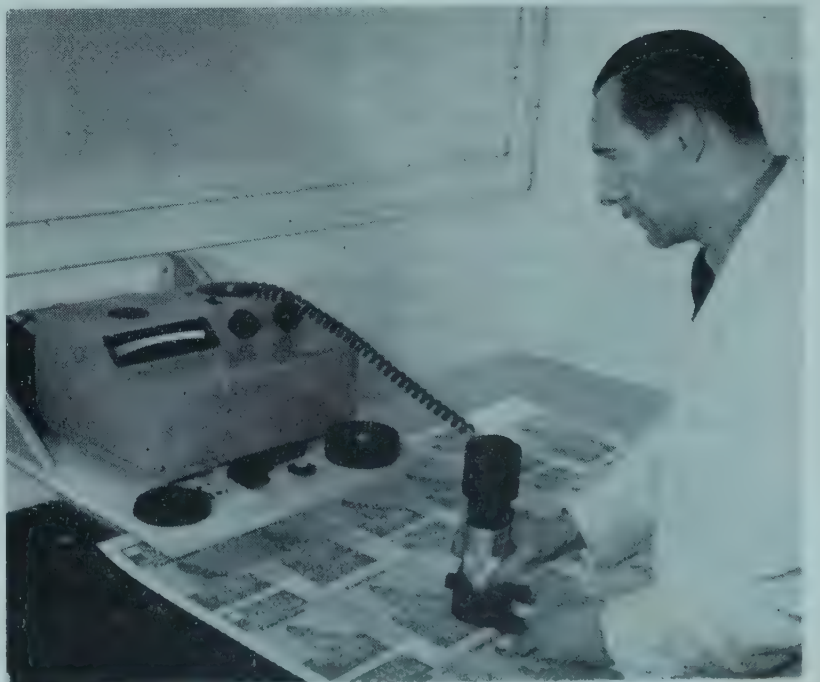
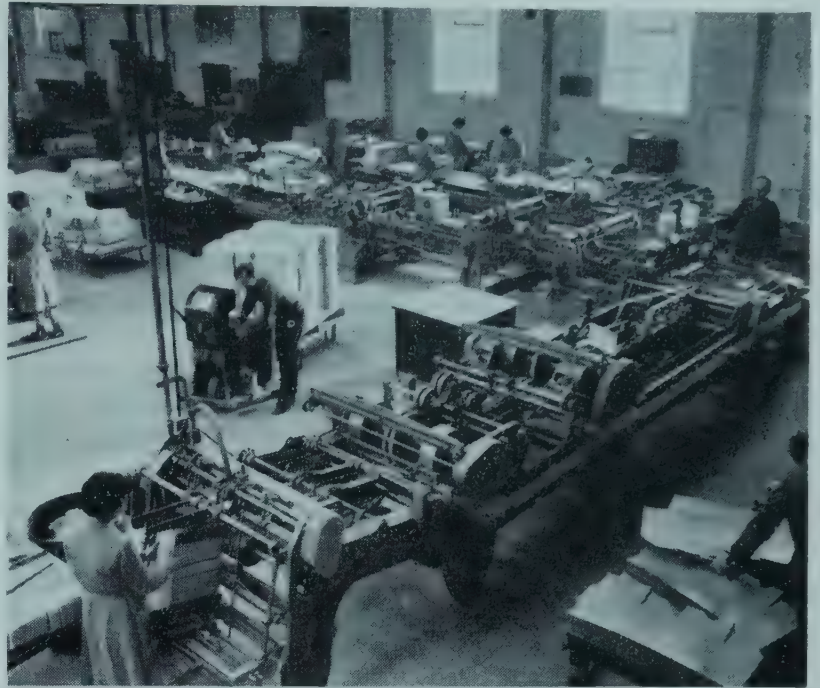
processes must be watched. In this instance, every advantage must be taken of stock size sheets or reels so that the maximum output is obtainable from the material available. Due regard, however, must be taken by the box maker or converter of the grain way of the board, as this should run at right angles to the main creases of a box if it is to be a first class and strong job. Many manufacturers of both paper and board mark reams or packages with an arrow to indicate the grain direction for ease of working and for the purpose of feeding into machines. In making orders, the grain direction relative to sheet dimension may be specified and so wrapped. Where large off-cuts are left over from the run, they may be used for smaller jobs and general ticket work.

The production of various types of collapsible cartons is very much the same in principle as printing by the various processes, i.e. letterpress or litho. The sheet is printed in the flat prior to the cutting and creasing process. All of these operations must be carried out to the utmost perfection as the finished carton, container or box will only work efficiently on the flow line if properly cut and scored

at the point of creasing. In the production of the carton or collapsible container due regard must be taken of the ultimate machine filling operation so that the packager experiences no filling or enclosing difficulties. In the process of carton make up, the shapes are not completely cut from the flat sheet, but are left attached to the blank portions of the sheet with the waste material attached so that ease of feeding or handling may be achieved at the delivery end of the machine. Perforations or notches enable the operator to strip out or remove the blanks for the purpose of glueing or make up. Production rates on modern machines produce 60,000 glued cartons per hour and this current everyday figure is being further improved with additions and refinements to box making machinery. In addition to glueing, wire stitches are used where more than one piece of box board is used and folded to make up the ultimate carton unit. Counting devices are a feature of modern carton making machines and specified quantities are marked off in batches of 25's and 50's or as required.

Carton or Box Definition

With progress in both packing and packaging methods, materials and containers, names are somewhat loosely applied and in this connection the name carton box is often given to many kinds of containers made from paper or board material. With so many food and beverage products individual definitions have been given to various types of boxes. For bulk packing, for example, the fibreboard corrugated made item is generally termed a packing case as it is obviously designed to serve the purpose of a wooden packing case. Where containers or cartons are made from paper based material, the name changes relative to certain features in the make up or usage of the container. Usually the name 'carton' is applied to any kind of box which contains a single item or unit. Such unit 'cartons' may be packaged in a larger type of 'container' and this is termed a display outer holding a specified number of cartoned units. In such forms of packaging the 'carton' changes its name to 'inners'. Both forms of units may be printed carrying name, brand mark and trading message. There is therefore a fundamental difference between 'outers' and 'inners'. In the main, cartons are made to simple shapes as this assists manufacture and helps in the control of price. Rectangular shapes will hold most types of food products and these are simple and less costly to manufacture and package suitably in the display outer. The display outer itself may be quite involved in colour, shape, display and formation but this has to attract the eye to the product in order to assist sales



The illustrations show steps in the manufacture of modern cartons, printing machines used in their production and a scene from one of the quality control laboratories. Printed sheets taken from the machines are checked on a colorimeter for uniformity of colour.

(Photos courtesy Reed Cartons Ltd.).

at the point of display. On the other hand, there is no need for costly and involved display outers where the everyday established product has to be merely housed and displayed as a reminder. Often the simple strawboard outer will suffice particularly where a well-defined and well-printed carton or inner is involved.

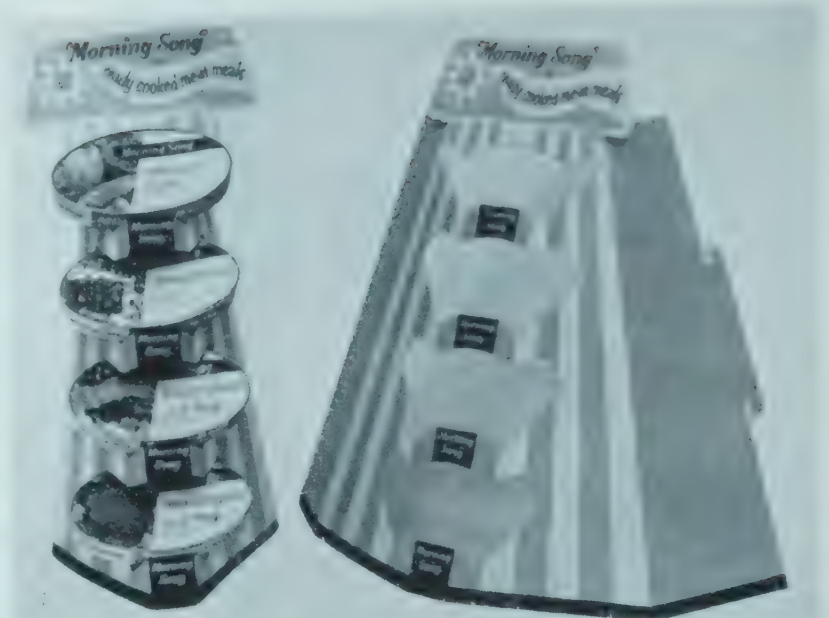
Forms of Carton Closure

The display outer itself, when complete and packed with contents for shop window display, may be closed merely by tuck-in flap or some form of slip slot device which is secure and easy to open up when required by the retailer. On the other hand, there are various forms of carton closure designed to seal the carton firmly. Good lock ends have been developed, many of which are the patent design of the box or carton manufacturer himself. Some cartons have their end flaps glued home fast into position so that they have to be torn away after purchase for the purpose of contents usage. Here are the various styles of flap end carton closure:

The Tuck-in-Flap Device.—Where frequent recourse to a package is made to extract part of the contents, the importance of good strong board material cannot be over-emphasized. Flaps which tear away or break easily from the carton may impair the remainder of the contents. This method of closure consists of two short side flaps and one longer one either end of the carton. The two side flaps fold down flat and the longer suitably scored flap neatly folds in to form the closure. There are reverse and parallel flaps and in the reverse type they are to be found on opposite panels while the parallel type of flap is to be found at each end on the same panel as the carton. It will be found when planning the layout of the carton on the flat sheet prior to production that more wastage is involved where the parallel flaps are included as they do not fit into the general scheme or layout so well as other types. Where goods are packaged automatically, this type of flap is used, but it should also be remembered that contents secured in this way may be removed before actual purchase, but this is not so with the skillet type of closure where the carton is firmly sealed with adhesive.

The Skillet.—In most cases there are four end flaps which come together for a common closure point ready for adhesive sealing. All three flaps are brought together and the final flap is used for adhesive application. The carton thus closed and sealed is pilferproof and must be torn in order to extract the contents. Automatic filling machines usually incorporate this method of carton closure. Today, most cartons are printed and not lined with box material. Some cartons are made from plain box board and over-wrapped with a designed packaging paper or wrapping. In such processes of packaging all ends must be sealed.

Slotted or Lock end Flap Cartons.—This is yet another popular type of carton designed with two equal side flaps which fold down, often with a corner clipped off for ease of opening up, and two additional flaps, one with slots and the other with the locks. Such a carton gives more security



A showcard display stand made by Reed Cartons for 'Morning Song' products.

for the packaged item during transport and display. There are various methods of slotting and these can have a relationship to the type and size of carton and the contents packaged. Whatever the method of closure, the means whereby this is carried out must be studied in order to determine whether the carton has to be sealed or secured by automatic or other means.

Display Materials

Many food and beverage packagers include showcards, showstands, display pieces and materials with specified quantities of packaged products for the purpose of shop window display. This is used by the retailer and with some skill, the goods are presented against an attractive background of colour and design with supporting sales message relative to the use, merits or price of the product. Window stickers and sales bills, pelmets and transparencies are yet another form of shop window advertising carried out by the retailer in support of a manufacturer's products. Often the brightest and best display pieces take the show and get more frequent and longer display life while the lesser displayed products are relegated to the shelf and produced only against request.

Seasonal pelmets harmonizing with special occasions and the time of the year often form part of the display and some of these ideas are included in the packaged goods. Once upon a time crêpe papers held the field but today many types of contemporary designed papers, metal window display rolls and smart show stands are used to extol the merits of the goods. Whatever the medium, it is in the main well received by the retailer and usually employed as a background for the window display. Almost any type of fancy paper used by the box maker for covering and lining purposes may be used as window display backgrounds and designs which harmonize with the packaged product can look very appealing. Colours should be chosen which harmonize with the package, and where the pack is comparatively plain, some brighter colour will serve to enhance

the display. On the other hand, bright packs will need little supporting colour, but if any is used, it should be subdued. The seasonal aspect of the year may be used in the window display motif.

Box Lining and Making Papers

While there is a distinct trend towards the use and application of printed folding box board and the carton board, thus obviating the necessity for a box lining paper, the rapid advances in packaging appears to take into account both the printed carton and the continued use of some kind of fancy paper lined to plain material. The development in seasonal and gift product packaging has, in part, been responsible for the introduction of many new types of specially designed fancy papers which may be used either as packaging papers or box linings for many trades, not the least the food and beverage industries where certain products are specially packaged for seasonal and gift appeal purposes.

Generally speaking, the trade term box lining or box making papers covers a multitude of various types of papers, patterned, printed, fancy coated, embossed, enamelled and surfaced papers, friction glazed papers, the more recent glosscote papers, gift, signature and seasonal patterned papers, metal coated and lined papers, marble papers, grained papers and a whole host of kindergarten, toy motif, nursery and festive designed papers any of which may be chosen to tie up with the product, its special appeal, its character or its general accepted utility. There are many types of established fancy papers used for box making purposes and these continue to operate in their various field of usage. Flint and friction glazed papers, for example, enjoy a popularity in the chocolate and food packaging trades where choicely printed coloured glazed papers are used to both wrap and label the product. Most packaged beverages are either tissue wrapped or put up in printed cartons for the festive occasion or gift appeal.

Any packager may take advantage of a specially designed fancy paper for his sole use, the pattern being formulated by the expert designer, incorporating brand or trade mark. Such fancy papers may be used as direct wrappings or packaging papers or they may be used for box coverings. Both printed design or pattern reproduced on a suitable paper may also carry an embossing and this too may be designed in the form of a trade mark. Often plain papers such as clay coated enamel or surface papers are used for box making having been treated with a grain or embossing. Any colour, pattern or style may be produced to specification provided that the quantities involved are sufficient.

Box covering papers are used to line plain strawboard, chip board and similar material used in box or carton manufacture. Any type of box from the simple to the ornate casket may be lined with a chosen paper, thus adding appeal to the product on display. Some industries have long recognized the appeal of metal coated or lined papers for their boxes and in this connection, perhaps the perfumery, cosmetics and soap industries are among leading users of such material.

Many choice patterns may be obtained from stock and there is a wide variety of designs from which to choose. Most box making papers are made in the reel 20 in., 22 in. or 26 in. in width, the basic papers being coated, printed or embossed, either one of these processes or a combination being incorporated into the finished paper. The larger box maker uses fancy papers in the continuous reel, but supplies may be obtained cut to sheets of standard size and these may be used for lining, display backgrounds, or in some cases, for wrapping or packaging papers.

Fancy papers vary considerably in quality and prices range from the less expensive continental and British box lining papers often called fancy prints to the exquisite hand-made marble, mother-of-pearl cretonne or fabric types of fancy paper used for the high class trade.

The paper maker makes the basic or body paper and the paper converter or printer reproduces the design, pattern or motif. Most fancy papers with a definite design are not suitable for additional overprinting and any trade mark or brand name has to be applied by label or seal. This may be used to form the closure of the package. Fancy tyings, cameos, and gummed labels are other methods of package closure and such materials should be chosen which harmonize with colour or design of the fancy paper. Plain box lining papers such as flints, surface and enamel papers, friction glazed papers, glosscote (or similar paper made and marketed under a trade name) may be specially printed, embossed or similarly treated by the printer or trade embosser.

Some reference may be made to the tartan plaid box lining papers and other traditional fancy papers used for lining, wrapping or box making. These have a popularity in Scotland where they are used for packaging shortbread biscuits and cake, among other items. Authentic patterns have been produced of most of the Scottish clans or plaids. Such papers are in the main, well printed on good quality base paper and some have a varnished coating which further enhances the finished appeal of the paper. These papers are used for gift and special occasion packages and as such, when the product is purchased, are ready to post or present as a gift. Some products are packaged complete with gift tag or label so that the name of the giver or sender and the recipient may be added, thus making the gift more individual. The more recent vogue of gift wrapping papers and their application could conceivably have grown from this original presentation idea.

Many types of fancy papers are printed on strong basic papers such as sulphites and therefore make first class strong lining or wrapping papers for bottles and other packaged items.

Some established varieties of box lining papers are mica embossed, suede leather and leatherette papers, floral designed papers, flock papers, wood grain papers, to mention a few of the varieties now used in box making and general lining work.

Future Trends

More and more food packagers tend to employ some form of viscose printed film as an overwrap in conjunction

with a plain cardboard carton, and no survey of fancy wrapping or box papers would be complete without some reference to these all-embracing filmic wrappings and packaging papers. With the increasing use of pressure sensitive tapes for package sealing and closure purposes and the introduction of heatsealing films, the use of the transparent film tends to grow annually. There are stock printed or embossed designs in colour or special patterns may be obtained on the lines of the signature paper. Many types of filmic wrappings are made with inherent heatsealing properties so that such base papers printed or embossed, form a first class wrapping or packaging medium. Poultry, meat, fruit and vegetable packagers are among the large users of viscose wrappings and with the introduction of seasonal printed patterns their application in the food and beverage trades is sure to be developed.

Glazed transparents, glassines, vegetable parchments, all used in food packaging as some form of barrier, may also be obtained embossed or printed with stock patterns or to specification for suitable quantities. The development of the self-service stores, where eye appealing, novelty and pack or product visibility are important aids to selling, plain and printed films in colourless or colour, may well form the outer covering of many types of carton packaged food products.

Many well-known branded grades of cellulose wrapping of the moistureproof and non-moistureproof types are available with printed seasonal patterns which have an appeal for gift and festive packaging.

Special Occasion Papers

Another important development in fancy paper patterns and motifs are the series of choicely printed papers designed to link up with some seasonal or important occasion. Many choice patterns in these new ranges are reproduced in colour with supporting embossing printed on good quality base papers. Most are strong papers and may be used for packaging or wrapping while others line well for box making. The motifs have relationship to various special occasions and are designed with a purpose. Tie-on tags, seals and greetings labels are available to use in conjunction with these wrappings. Such packaged goods display well and afford the opportunity to the retailer to demonstrate the goods to advantage at the point of sale. It is safe to predict that other specially designed patterns in this field will follow on, covering a wide range of occasions and gift appeal purposes.

Many of these gift papers are being used in the manufacture of bags, satchels and wallets and may be obtained from stock and used by the packager or the retailer to house suitable food products. There is considerable scope in their application for various sections of the food trade as patterns include nursery, kindergarten toy and other patterns. Infant foods and invalid food products may be suitably wrapped in some similar kind of designed paper with a message or motif relative to the occasion. Drums, trumpets, balloons, bells, toys are among the motifs in the kindergarten series while blue birds, ribbons, bows, and

bells form part of the motif of the gift and greetings special occasion designs.

Surveying the past and taking into account the present and future trends, the observer may well assess the development of fancy wrappings and box lining papers as following the lines of gift and greetings papers with the accent on cellulose films in all forms. Very definite trends may be seen towards the signature designed fancy paper too, but this, at present, takes only the medium to large packager into account. While this progress takes place in food product presentation, it should be repeated that the well-established favourites will continue to operate in their various fields of usage as these tried and proven box lining papers appear to continue to make an appeal for some special reason. Tastes and fashions change in design and we live in a contemporary age, but certain restraint appears to be placed upon box papers where the established product is concerned. Perhaps the label or seal may be re-styled to provide a new look to the product.

Metal Lined and Metal Coated Papers

Metal lined papers, and coated and aluminium foil laminates are also among the popular materials in use for packaging and wrapping, the type of material having an application in direct wrapping as a barrier, lining for box making purposes or the production of embossed gummed or heatseal labels and brand seals. In addition to aluminium and gold, there are several coloured metal papers either with a plain, lacquered or brushed surface, plain or embossed with a pattern. They may be printed in several colours to specification and in this form they make a first class packaging medium for the branded food article. Metal lined and laminated papers are fingerproof, dust-proof, moistureproof, and when surface treated are untarnishable; they make first class protective barriers for packaged foodstuffs where these features are essential to packaging. In addition to seals and cameos, metal foils are commonly used for bottle labels, neck and cork decoration in the high class wine and spirit and some beverage packaging schemes.

Metal papers and boards in the heavier substances are used for showcard, showstand and display work where they may be used for displayed products serving as a brilliant background for packages, cans and bottles.

Hand Made Fancy Papers

Some reference has been made to such papers as mother of pearl, flock papers, hand-made marble papers, fabric lined materials, cretonnes, silks and satins still produced in the high class box and casket making trades for the packager. High class caskets and fluted boxes are often covered with similar linings and, as such, they make first class display pieces for seasonal and gift occasions. Many of these caskets have an after-use appeal and where a brand name can be incorporated into this style of box or casket, the product is long remembered after the contents have been used. Hand-made boxes are often secured with ribbons or fancy cords giving the finished pack, when filled, a first

class appearance. Fancy and high class food products, confectionery, and chocolates so packaged provide all the eye appeal to the product where selling price allows such de luxe forms of packaging. Much may be done with fairly inexpensive flock papers, a lining material which is something between a paper and a textile with a plush surface of suede, baize, velvet or plush, which is most attractive. Coupled with rich colourings and often a choice embossed pattern, they may be used for the presentation package or for box coverings of high quality.

Printed Cartons

Any type of paper or board from thin to thick substance may be surface treated to a grain or finish, an embossing or where suitable box lining material has been printed, coated with a surface lacquer or varnish. In this way, many plain or printed papers and boards may be converted into attractive packaging materials and wrapping papers. Another current trend would appear to be the increased use in the food industry of the printed carton in its various forms. Board manufacturers are now producing inexpensive carton board material on mass produced lines which may be printed and coated with a surface lacquer and made up into attractive boxes and cartons of all kinds. Plain cartons are used merely treated with a printed band or over-wrap, such methods produce a well turned out box which answers the purpose. Acetates, polythene and heavy gauge filmic material plain or printed is also increasingly used for packaging food products. Waxed board, printed before the waxing process, also finds a place in the scheme of packaging foodstuffs. However, with the rapid growth of the supermarket, and the favourable impression better product presentation is gaining among the consumer, there appears to be room for all methods and the fancy box paper and liner will always find a place in packaging schemes for certain products. With suitable wrapping and folding strength, certain types of fancy wrappers are being used, with an inner liner, as wrappers for block chocolate, obviating the use of the board carton thus reducing weight and bulk in some instances. The choice of packaging medium and material will have some relationship to the degree of all round protection required for the product.

Fancy Rigid Decorated Boxes and Caskets

The highest grade fancy papers, mostly of the hand-made variety, including silk, cretonnes, brocades, flocks, satins, velvets, in conjunction with tassels and ribbons are used in the luxury trades for de luxe gift rigid type of box and casket. Such materials are lined down to a good class board material supported by a packing or cotton wool or wadding so that a well-moulded box with a defined edge is produced. In the make up of the padded hinged lid, the material is invariably pasted or glued at the edges of the box only, while caskets or boxes without supporting padding are pasted down flat to board surface. Specialist hand made casket and box makers are able to produce small to large quantities of high class boxes which have a demand in the fancy goods, confectionery, perfumery and gift packaging

field. In some types of boxes, the printed box top plays a part forming the show piece for display when the box is seen on the shop counter or in the store window. Varnished and grained box tops also help in providing the finishing touches to the plain box liner. Where the food packager has a seasonal product to package in some form of fancy box, ideas may be obtained from the specialist.

Considerable attention appears to be paid to design, pattern and motif of new seasons papers. Some new patterns survive and become established while others, as is the case in the wall paper industry, are produced for a season only. Every use is made of colour, design and background in order to provide some variation. For suitable quantities, large users of fancy papers may reserve a pattern or style for a period and beyond this point, the signature type of fancy paper is specially designed for an individual packager. The branded product will need an individual pattern or style of packaging material if it is to become recognized by the consumer while goods are on display.

Current Overseas Packaging Ideas

A recent survey by the author in several continental countries relative to the packaging of foodstuffs and beverages, reveals many interesting and novel features incorporated into the finished pack. Some of these ideas are reproduced here. The predominant features in most cases are the after-use appeal of the empty container, pack visibility affording full protection for the product, labelling the pack by heatsealing labels or by the metal seal, the use of colour wherever it can be usefully employed, and novelty and eye appeal.

The Use of Bi-lingual Labelling

Food and allied products displayed alongside British products in the shop window and in the supermarket, coming from the U.S.A., Japan and other countries, are labelled with supporting tag or label in two and sometimes three languages, particularly where instructions re usage are concerned. This is specially noticeable in Switzerland where three languages are spoken, in Belgium where two are used and Italy a country now receiving many visitors. The importance of such bi-lingual labels should be borne in mind by the packager when exporting goods to certain overseas areas, particularly where they are offered in competition with other exporting countries sending in similar goods. The retailer is better able to discuss products, where required, at the point of sale when he can understand instructions on the label and the consumer, too, obviously finds his own language more to the point where a new product is concerned. While an increasing number of Europeans now speak English, there are some aspects of a language which must be understood where it involves food and beverage hints or recipes. Brand names obviously remain the same but supporting matter could with advantage be printed in two languages one being English and the other the local tongue where the goods are exported and sold.

Pack Convenience

The growing tendency for people to take frequent weekends, the camping craze abroad, the motor car picnic and the hitch hike, demands compact, ready-to-use, portion by portion, fully protected food items such as condensed milk, mustard, pickles, and similar adjuncts to the outdoor meal. Many countries abroad cater specially for this rapidly growing trade, the aluminium foil tube being a useful and popular means of packaging such items for convenience. Polythene bags heatsealed hold other portions of foods, while canned foods are often put up, in doubles, two cans to a pack complete with convenient opener device. Patent openers and pourers to bottled products, often with screw-on outer plastic caps holding a given quantity of drink, are the order of the day.

After-use Appeal of the Container

Denmark and Holland, in particular, appear to place some emphasis on certain kinds of culinary products and similar household items such as pepper, curry, coffee and very suitably house such items in specially designed containers which serve the need of the user in the kitchen as a sifter or dispenser. Some of these ideas are illustrated. Plastics and acetates are used where full visibility of contents is desirable so that users can quickly see whether it is time to order fresh supplies. Many boxes, cartons and containers are made with perforated holes, patent spouts or pourers and the container itself, being most attractive, finds many uses when empty.

Many types of flat cans and metal boxes are direct printed in colour thus obviating the use of a label. Flat tins of smoked salmon, olives, sardines, etc., for example, are printed in colours representing the contents. A whole series of these attractively printed flat tins are now to be seen in Western Germany; they make a first class display and fully illustrate the packed contents.

Foil wrapped cheese portions are packaged in an acetate box which may well serve after use as a cigarette case or for some other purpose. This is a popular Swiss pack and one that fully reveals the well labelled and packaged contents of the box.

In the field of beverages, novelty bottles of many kinds made of glass, procelain and earthenware may be seen on the continent, many of which are now being exported to England. Many miniature liquor novelties representing table and hanging lamps of various kinds make a first class window display and provide a container with an after-use purpose. The double bottle style of glass container for liquors will serve as a table cruet, holding vinegar and olive oil or other sauces or liquids.

Packaging Materials in Popular Use

Viscose film in all gauges, colours, printed and embossed appears to be a first choice for foodstuff packaging in many countries abroad and many types of novel bags, satchels and wallets are being produced from one kind of viscose film or another, heatsealed at the seams. Filmic material is largely used as an overwrap and many kinds of high class

beverages are choicely packaged, pleated and wrapped in a suitable film. Everything is done to introduce pack visibility where possible and filmic windows are suitably incorporated in many food packages so that contents may be seen either wholly or in part.

Aluminium foils and laminates are very popular for packaging powders, dehydrated foods, soups and similar granulated items. Cheese of many kinds in small to large portions and whole cheeses are packaged in brand printed foil. Many paper packed products carry a foil printed band, a wrapper, a seal or ribbon suspended tag. Metal foil labels, designed and printed in colour, with shape and style, are attached to several medium to high class food products. Some serve the needs of a seal closure and guarantee label.

Biscuits in Western Germany are often most attractively displayed in open cartons, revealing three, four and five separately wrapped packs in gold foil with a first class printing. Some carry an outer covering of viscose film to afford protection to the choice and somewhat delicate metal wrapping.

Some form of header label is often incorporated in other forms of visible packaging and units of confectionery and similar small items are often packaged in this way. An example of this is shown—the Popchain from Western Germany—such a pack being made to display suspended on a card so that they may be taken off a hook fitment or counter device. The header bag label is well established as a means of viscose bag closure and many food products are finding their way into filmic bags being sealed at the mouth with a heatseal header label which, when printed, serves as a seal and brand label for the packaged product.

Carrier Bags

In Western Germany, Switzerland and Belgium, some attention appears to be paid to the design and production of a first class carrier bag of quality and strength. Extra strong wet strengthened kraft appears to be used for many carriers which are well shaped and printed. Some have special reinforced handles with stout block bottoms. Such a shopping adjunct is certainly a good form of travelling salesman for the product and the trader. Some attention could be paid to the design and strength of the carrier bag on the home front. Some carriers incorporate printed shopping reminders.

Retailer counters are suitably fitted in most cases with highly plated tiered counter roll holders which dispense sheets of kraft from the reel, well printed, in which to pack the purchase. This is an alternative to the popular carrier bag. Full use is made of printed gummed tape and viscose self-adhesive tapes which are dispensed from suitable sealing machines on the shop counter. The parcel carrier device, a strip of gummed tape which incorporates a length of raffia is predominantly used in some countries abroad but the idea has never caught on in this country.

Display Containers

Many manufacturers and packagers of food products and beverages are using the relatively new form of packing

case made from fibreboard corrugated material which not only houses bottles and canned goods of all kinds, but serves the purpose of a display piece upon opening up. Top flaps and sides are made to fold back or drop down so that the packed contents are fully displayed in an attractively designed and printed case from which the retailer may demonstrate and sell products one by one. Many of these packing cases are made at home for the export market and their usefulness with this additional facility is worthy of some investigation.

Some Container Novelties

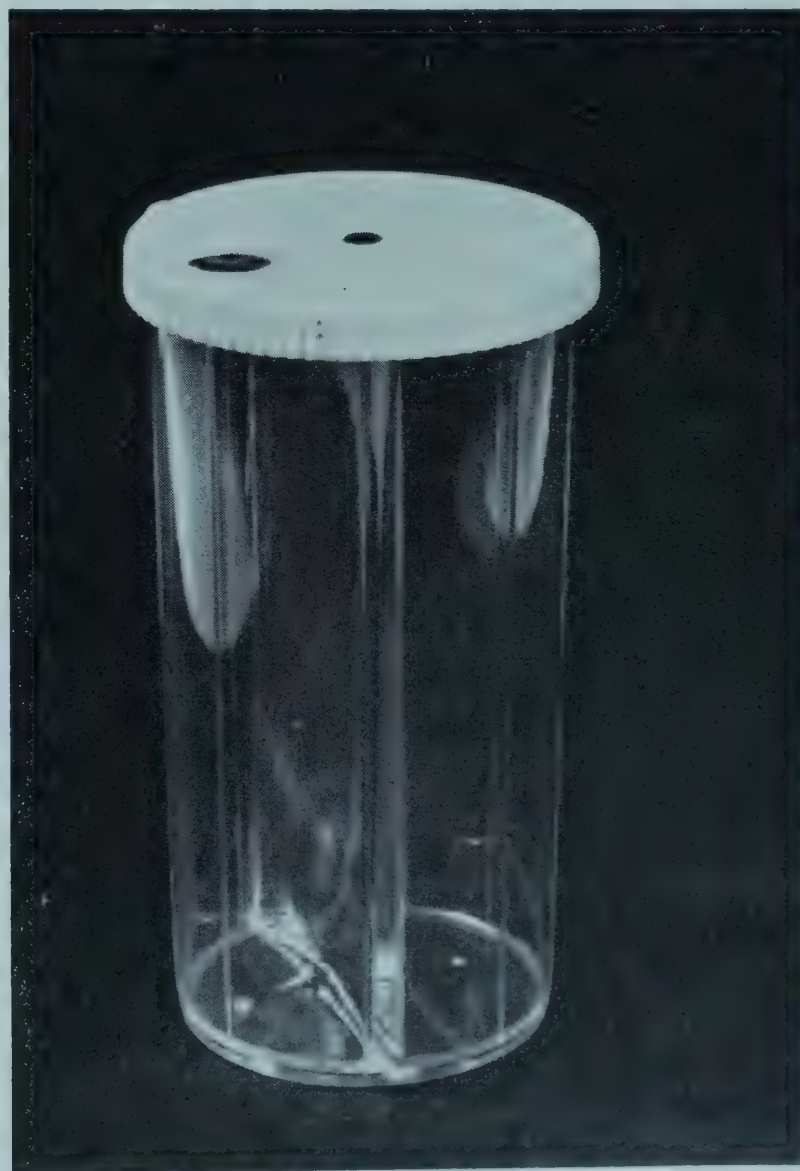
Food and beverage packagers could benefit from occasional visits overseas where many novel ideas in food and beverage presentation may be seen. A study of new applications of established materials abroad may give rise to some pack modifications at home. A general exchange of ideas can be most valuable; above all, the importance of the label, its appeal and interpretation into the local language, particularly where hints and instructions are concerned, is a most useful adjunct to increased sales on the export front.



Flat canned food products such as fish, vegetables are packaged in very attractively printed tins in full colour, the contents of the container being faithfully reproduced in all detail. The West German smoked salmon pack looks well mass displayed alongside other similarly printed flat tins. This obviates the need for a label.



West German glass container novelty containing liquor. Well designed with raffia bound handle and neatly plaited raffia lampshade. Made to hang or stand, this novel container may be easily converted into a table lamp. It is some 9 in. in height by suitable proportion. Makes an attractive display piece and ideal for a gift purchase.



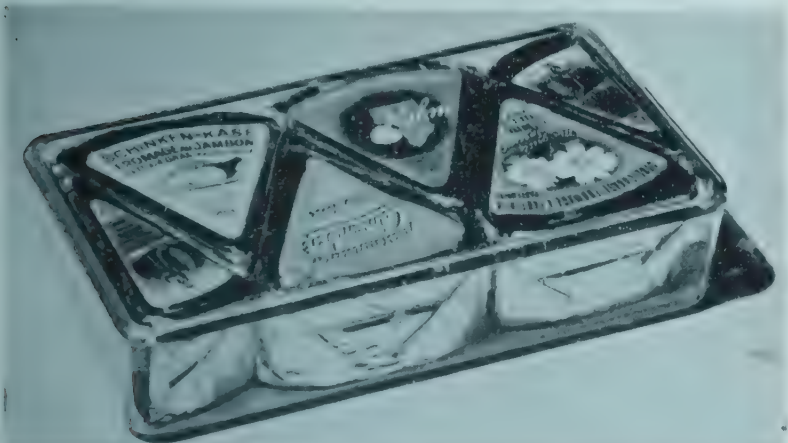
Danish heavy gauge acetate container designed to hold granulated materials. It is sectional so that more than one item may be filled into this novel after-use container. The lid revolves, the contents being poured out through pierced holes when required



A coffee holder container with a very definite after-use as a sieve or strainer for the household. These containers made from thick gauge acetate, may be used for various kinds of fine and granulated materials.



Italian quick serve pudding mix with full instructions in three languages for making up and serving. Ideal for the picnic, camping and the snack at home. This novelty pack is full of style and colour, it contains pudding powder, vanilla, sugar, dessert and all the ingredients to make up the pudding. It is packaged complete with serviette and bowl for mixing ingredients. It displays well and is supreme for sheer novelty and convenience.



Swiss assorted cheese portion pack put up in a heavy gauge acetate film container so styled that it can serve many after use purposes, in particular a cigarette case. The packaged contents are fully visible and protected from any likely physical damage.



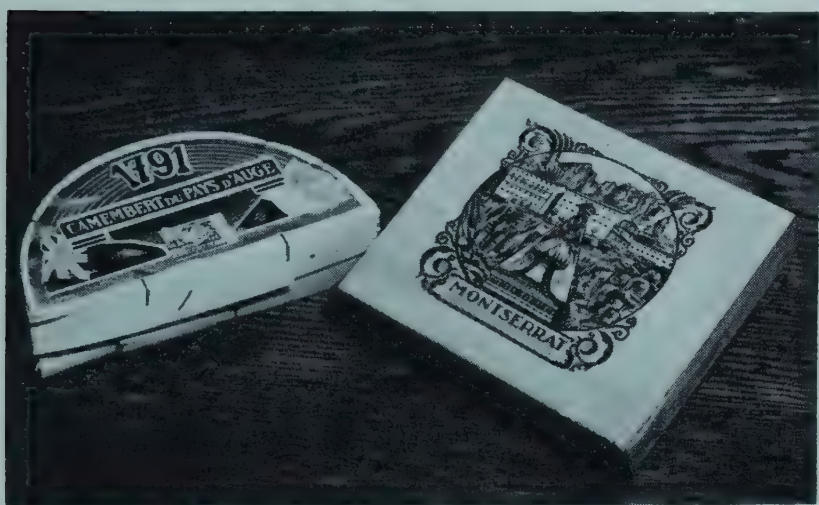
West German glass cruet liqueur container filled with two varieties of liqueur. The after-use appeal is at once evident and such items make first class eye appealing displays and are ideal for the gift purchase. May also be used for wines and spirits after the original contents have been used or for the table. Well labelled with the most attractive screw caps and bows, the basket is well woven and the whole container is well conceived.



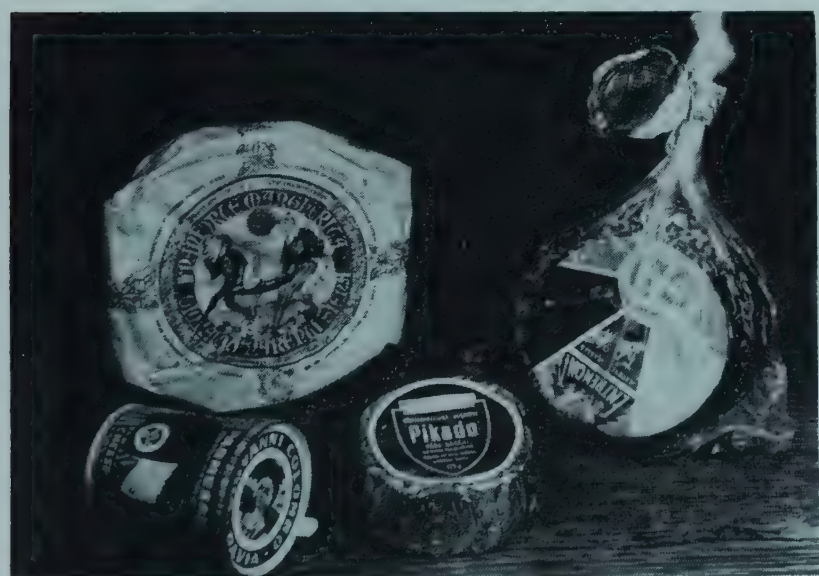
The ever popular liqueur presentation, this Dutch five divisional carton is smart and colourful making a first class display unit. The 'bottled' liqueurs are made of chocolate, well labelled and wrapped in coloured foils. The container is well turned out and sufficiently strong to avoid distortion or damage to the contents of the package.



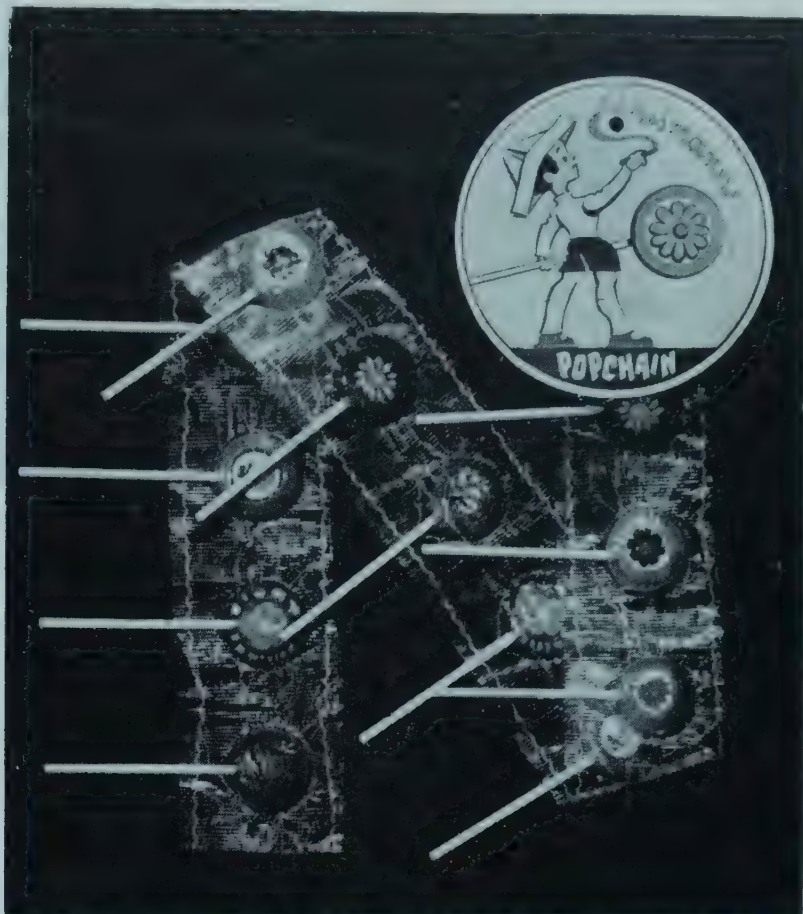
A Dutch novelty package of 'canned liqueurs' put up in a most interesting style, six assorted flavours being well labelled and attractively presented in full colour.



A half circular French cheese pack, the inner wrapping being of gold foil. The wooden carton is clearly and colourfully printed to advertise the contents. Also shown is a Spanish $\frac{1}{4}$ lb. candy pack most attractively presented in a wooden carton printed in full colour and amply protected from physical damage by viscose wrapping.



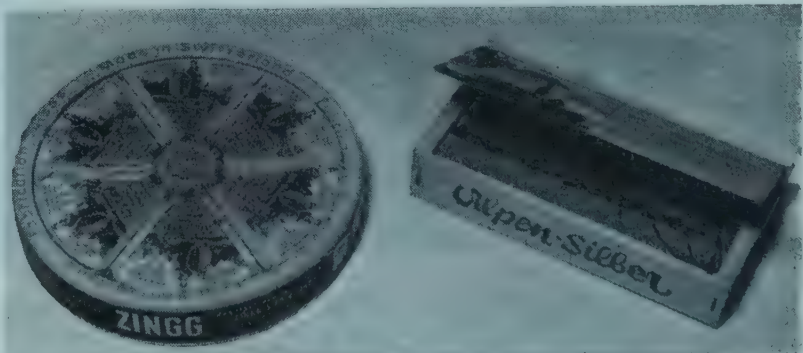
A selection of continental cheese packs. Metal foil wrapped, choicely labelled in colour and printed in Italian and English, viscose wrapped and sealed. In the foreground is a waxed cup type of carton holding Parmesan cheese.



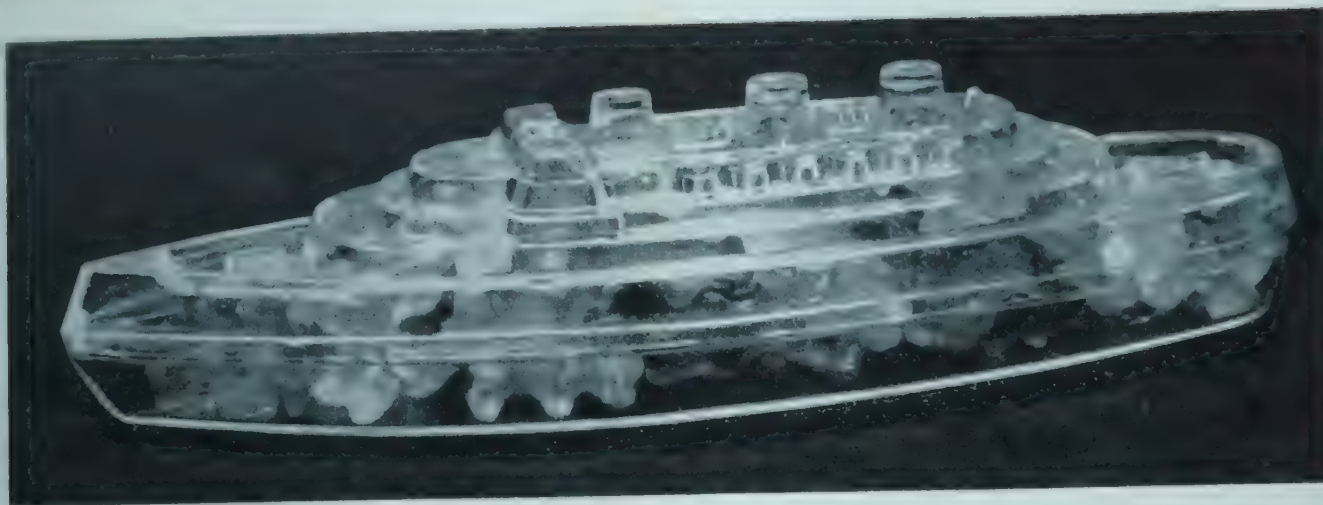
West German novel header card display piece for confectionery and allied items. It is made to hang on a special wire display from which units may be removed on sale. Contents are fully visible and protected from dust, the header card carrying the brand name and other advertising matter in full colour. Each item in this container is held firmly in position, the film being crimped and heatsealed.



Dutch 'Herring Fillets in Tomato Sauce' in an unprinted flat metal container. This is inserted inside a well designed and printed carton which obviates the use of tin printing.



Two very attractive decorative Swiss cheese containers with six portions of assorted cheeses delightfully presented in good style and colour.



A novel pack for the younger purchaser, this well turned out passenger boat complete with funnels is made from heavy gauge acetate. The filling in this case is jellies but this type of container may be filled with other granulated items. There is no need to enlarge upon the appeal and possibilities of such containers to old and young alike.



Continental packs. Right, a colourful and decorative labelled chocolate pack depicting a spring-time motif. Left, Italian acetate container pack filled with crystallized fruit. The contents are fully visible and amply protected; the container has an after-use appeal.



Danish curry pack in acetate film. The container has an after-use appeal as a funnel. The cover is fully protective and carries printed recipes relative to quantities used in various curried food dishes.



The Pepper Bus a very useful novelty from Holland containing various kinds of pepper, mustard and curry powders for the cuisine. The container is viscose wrapped and when opened up, a hinged lid is made to fold back ready for hanging in position. The colourful containers are made from plastic, fully named and have their special place, being inserted correctly to avoid replacement confusion after using. Holes are pierced for ease of application and the name of the items are repeated on the base of the cardboard container. It is some 9 in. in width and very compact, taking up little kitchen wall space.



Danish curry pack in acetate film. The container has an after-use appeal as a funnel. The cover is fully protective and carries printed recipes relative to quantities used in various curried food dishes.



Choicely printed filmic wrapping, airtight, secured ends with purity seal in metal foil for German sausages. The seals are most attractively printed on metal papers in full colour punched out shapes.



West German biscuit package of considerable merit and shop window appeal. Containing five units, each beautifully wrapped in gold foil printed and embossed, the carton itself fully reveals the wrapped contents. The package is filmic wrapped to afford ample protection from dust.



A fancy gift wrapping with a baby motif for special occasion packaging. This Italian paper is well produced, printed in three colours on strong base paper and used for wrappings, bag and wallet making.

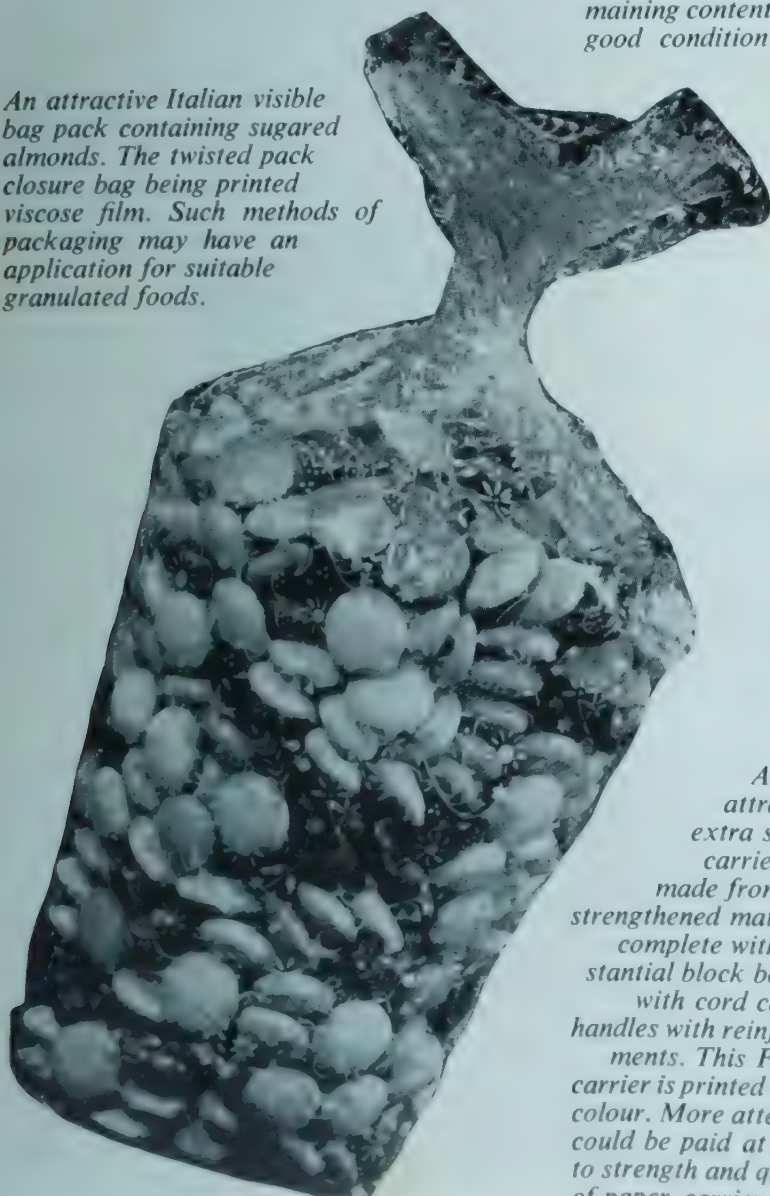


This is a new and novel container for mustard. In the shape of a hot dog, the mustard is actually made in France and has a delightful flavour. Made from hygienic polythene, easy to dispense, the container holds its shape to the last squeeze. The makers produce an attractive showstand which suggests six sausages on a grill. This pack is Anglo-French in conception, made in England and registration of both has been granted or applied for in many countries overseas including the U.S.A., Canada, Europe, India and South Africa.

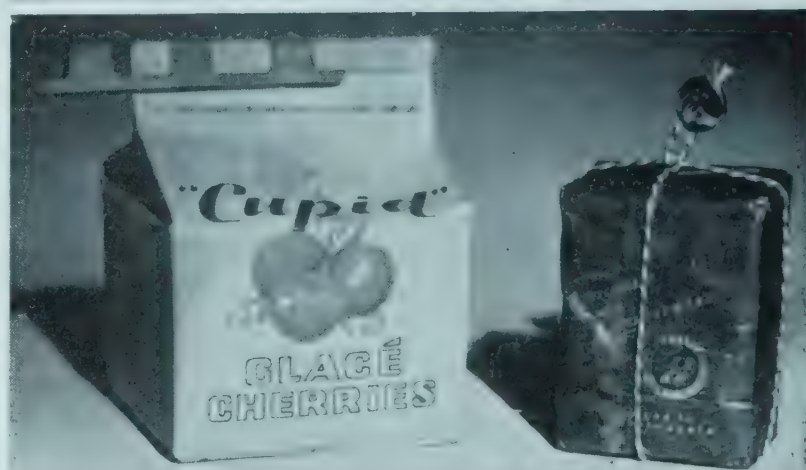


The best definition of the word 'Delicatessen' means delightful, different and delicious and from Italy comes the latest word in gay, exciting and unusual hors d'oeuvres. Polli's mixed vegetables in wine vinegar, featuring cunningly contrived fancy figures form a first class display piece and are just the thing for the party and special occasion as they are also ready to serve.

An attractive Italian visible bag pack containing sugared almonds. The twisted pack closure bag being printed viscose film. Such methods of packaging may have an application for suitable granulated foods.



On the right is shown a Scandinavian food presentation in metal can, printed in full colour, illustrating contents of meat and vegetables in separated inner fittings. The printed design fully describes contents and the pack makes a first class method of presenting foods for the picnic, camping and the quick snack in the home. Also two of many forms of attractive and secure closure of fancy food products and cheese. Slide off clips which press on after a portion of the contents of the pack have been used keep the remaining contents in good condition.



A most attractive extra strong carrier bag made from wet strengthened material, complete with substantial block bottom with cord carrier handles with reinforcements. This French carrier is printed in full colour. More attention could be paid at home to strength and quality of paper carrier bags.



CHAPTER 8

Fibreboard Corrugated Packing Cases

THE fibreboard corrugated packing case (not container), both standard and tailor-made, serves the needs of the food and beverage industries. Other cases may be specially designed for awkward shaped articles, fragile goods and the like which need special care and protection in transit and in storage. New applications of the fibreboard packing case continue to exercise the ingenuity of the case designer. In transit, the light weight of these specially styled cases and the smaller space they need as compared with other materials, such as wood, saves freight charges. A new departure in this type of packing case is the display aspect which is now incorporated in some types of packing cases. The retailer is thus able to open up and fashion the unit ready for display. These cases are now made for packing fruits, vegetables and all kinds of farm produce. By the judicious use of partitions, cells and layers of corrugated material, ample protection is given to the most delicate type of produce. Quick frozen fish in various forms is now packed in similar packing cases, the case being made from solid board capable of protecting such products during transit and prior to sale. The latest types of fibreboard material are proving so satisfactory that special protective barrier coatings and wet strengthening of material have been found unnecessary. Cauliflowers, lettuce and other vegetables now find their way into the market packed in fibreboard cases. A rigid one-piece-type case with flaps is used for such products, the packers forming the closure of the case with stitches. Cucumbers are yet another food item being packed in these cases, the top and bottom flaps affording every protection for the goods. Where the product has to 'breathe', specially placed perforated holes are made together with carrying handles or apertures. The added advantage of the packing case made from board material is that its surface may be printed in full colour thus affording the food and beverage packager every opportunity of advertising his brand or product during transit and while on display.

In this country, we have the most advanced machinery for the mass production of fibreboard cases and we have the skill and knowledge relative to design and styling any type of packing case required for each industry. Glass packaged liquids, such as soft drinks, wines and spirits, are now packaged for export in cases with liners and bottle neck supports which give extra strength vertically, and a perforated fitment is incorporated in such specialized packing cases to hold each bottle firmly at the neck, thus eliminating unit movement.

There are few industries which have developed so rapidly as that of fibreboard packing case manufacture and the fact

that they are made and delivered flat or collapsed to the packagers adds much to their appeal in packing. Because these cases are made with sectional devices to hold units in position, obviating the use of wood wool, and straw cushioning material, because their price is reasonable and their weight and bulk so much lighter than wood, this form of packing and packaging is of considerable value to the food and beverage packager. Paper is the basis from which the packing case is made and fibreboard is the general term given to the product of waste and other board making material. There are two main types of materials used in construction, one being fibreboard solid and the other corrugated.

Some of the outstanding features of the fibreboard corrugated packing case are as follows:

(a) Optimum protection for all products, however delicate, perishable or fragile, at a minimum cost, consistent with established performance.

(b) The scientific tailoring of the case to meet the needs of individual packagers for specific products and their methods of production and packing.

(c) Normal handling methods of bulk food and beverage merchandise and means of marketing the goods via the distributor or retailer.

(d) The very valuable space they save in being delivered in a flat or collapsed form ready for immediate filling. Their ease of transport in the stores and in transit.

(e) Their cost compared with other materials formerly used for bulk packing of foods and beverages and their reduced space volume and weight which saves transit costs and area charges.

(f) The fact that they are easy to seal with adhesive, sealing tapes, wire stitches, tensile steel strapping and that they become virtually pilfer-proof.

(g) The ease with which they may be opened and filled, in tailor-made cases designed to fit the product, unit or numbers of units, and the fact that many cases may be designed to serve as a display unit.

(h) Being non-returnable there is no need to set up a returned empty section and bundle or band empties and take care of the question of charges and credits. This has in itself made a tremendous impact upon the system of food and beverage distribution and has eliminated much unnecessary unproductive work and book-keeping.

The food and beverage industries have been quick to adopt this convenient form of product packing for store and despatch, such packing cases being accepted by air and sea carrying organizations at ordinary rates. In almost every branch of manufacture from food to the machinery

which is used for food processing, filling, labelling, etc. traditional packing cases made from heavy and bulky materials are being replaced by the new lightweight, strong and waterproof fibreboard packing case. In some five years, the output of the new fibreboard packing case in the U.K. has doubled.

As the trend towards mechanization sharpens, the building of a package into a manufacturing and handling process becomes more and more logical. The large retail organizations have begun to insist on a form of container which puts the least pressure upon available labour, space and storage facilities. Being clean and convenient to handle, fatigue factors and handling charges are also reduced.

Access to Supplies

The leading manufacturers of the fibreboard packing case have opened up branches in the U.K. where all kinds of standard cases may be obtained by collection or from delivery. Every packager may, on the other hand, take full advantage of the scientific and research facilities available. Products may be sent in for the purpose of designing special cases to fit them in any given number of units. Awkward shaped items and fragile goods may be specially considered.

Chain factories strategically spread out over the country enable the packager to obtain supplies of all kinds of packing cases, multi-wall paper sacks, bags and cartons so that there is no need for hold-up on the production line where stock supplies suddenly become low or exhausted. In addition to these packing facilities fibre drums, folding and rigid boxes, milk cartons, fancy boxes, paper and filmic bags and aluminium foil ware are similarly available from stock supplies to given standard sizes.



Cubitainer made by Thames Board Mills Ltd., to the design of Iridon Ltd. This is a die-cut corrugated case to hold the special polythene container used by Iridon. A feature of this case is the ingenious way in which the spout of the polythene container can be brought through the wall of the case so that the liquid can be emptied without disturbing the pack itself. Hand holes are conveniently placed for easier lifting.

Some Examples of 'Fiberite' and Bowater Eburite Packing Cases

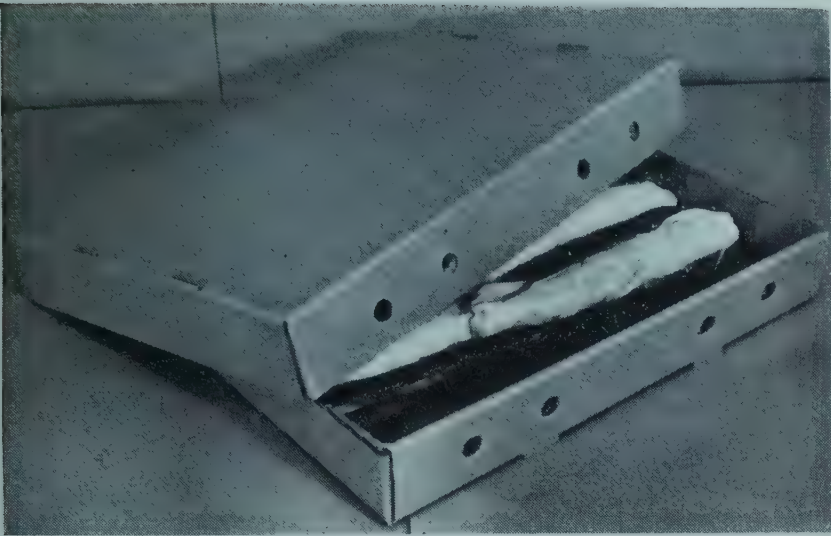
Illustrated are a series of package cases used in the food and beverage industries made by well known case makers. Of special interest (so far as liquids are concerned) is the more recent packing case called the 'Cubitainer'. Some of the new features of the fibreboard case are shown and are worthy of examination by the packager with a problem which may be solved by the introduction of some of these new refinements to the standard packing case. Carrying handles, hole perforations, cases for quick frozen fish, lock-flap construction cases which add ventilation as required for fruits and vegetables, special protective fitments and sections to cases, flanged liner and punched out fitments for bottled products, liners of polythene, patent spouts, inner fittings, display case features, cell-pack for apples in divisions and layers, moulded protective trays are among some of the more recent developments now incorporated in the modern fibreboard packing case.



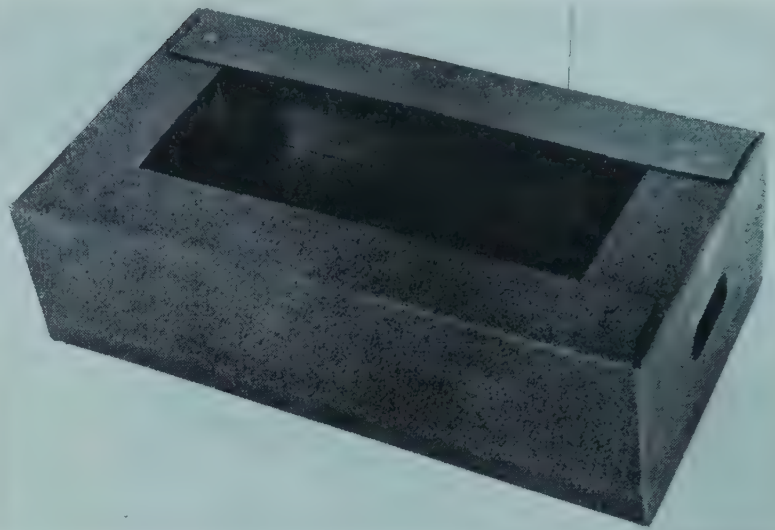
Fiberite corrugated case for fruit squash for export. Note the use of flanged liner and punched fitments.



Fiberite corrugated case with fitments for Camp Coffee.



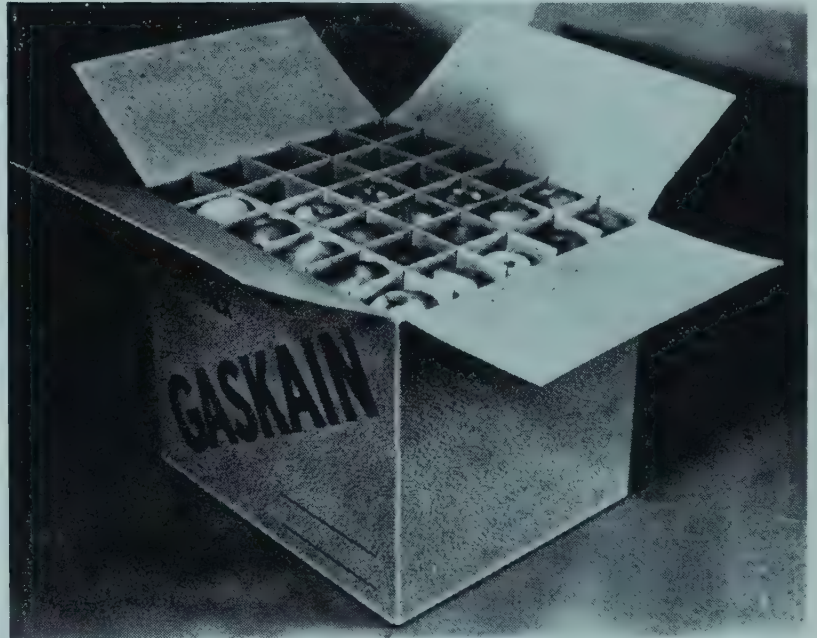
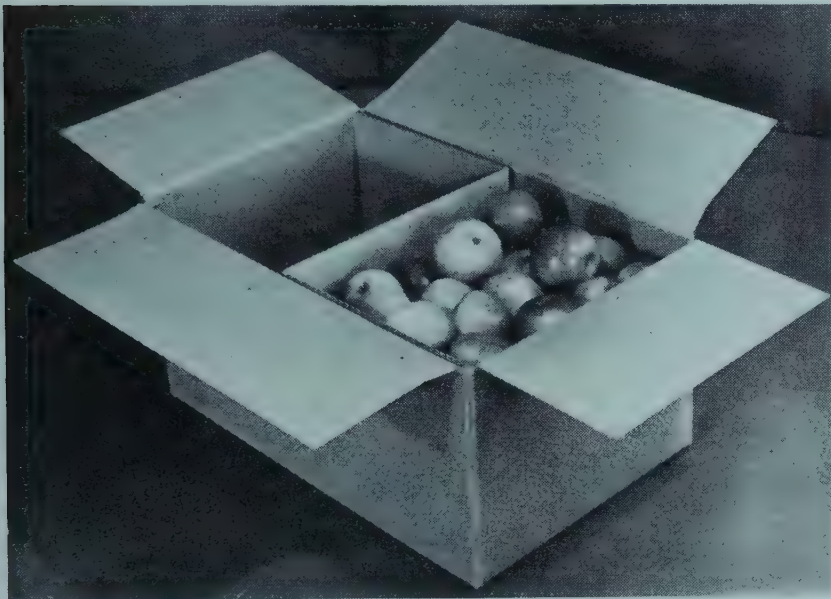
Fiberite pack for cucumbers. This is made from corrugated board and is of lock-flap construction on both body and lid. Note flanges which add ventilation between each pack.



Solid Fiberite tray for lettuce, broccoli, etc.

The solid Fiberite cell-pack for English apples (corrugated division and layers).

Solid Fiberite utility pack for English apples.



Fiberite corrugated tray for H.P. Tomato Ketchup.



Solid Fiberite case for quick frozen fish.

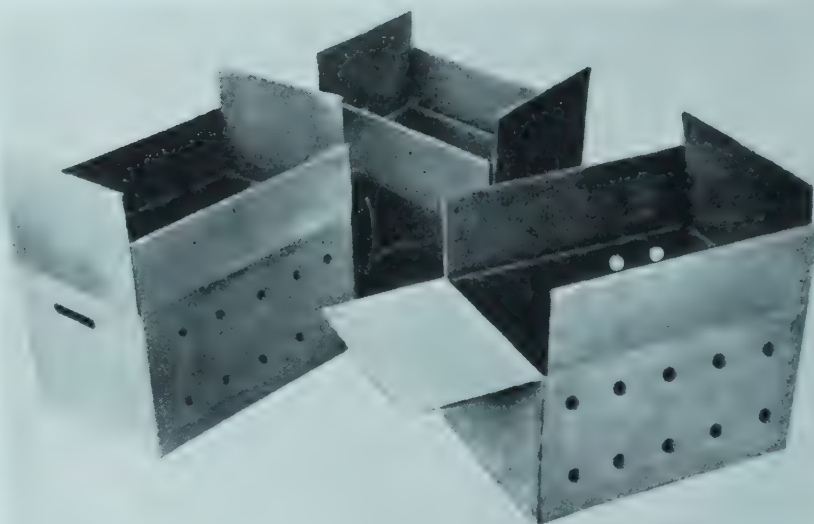


Fiberite corrugated case for canned broad beans, packed by Lincolnshire Cannery Limited.



Fiberite corrugated case for preserves for export including flanged liner and corrugated cells.

A die punched-out case illustrates a food package case which allows the produce to 'breathe' while in store or on sale. Note carrying handles.



The solid Fiberite case with Hartmann leaves for English apples.

The Bowater-Eburite egg pack. Non-returnable corrugated fibre-board 30 day egg pack to B.E.M.B. spec. 30AC, for use with standard Keyes trays. In two sizes (large and standard) they are delivered flat, easily assembled by unskilled labour, and may be stitched, gummed or paper taped. The cushioning qualities of the board reduce the risk of breakage.





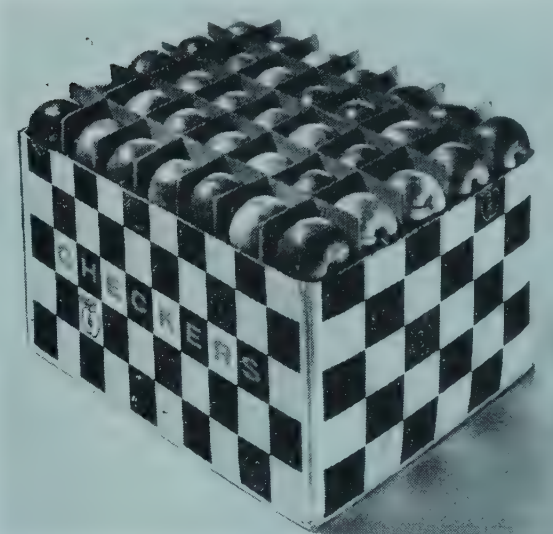
Fiberite corrugated tray for lime juice.



Corrugated Fiberite case for Pearce Duff's table jellies.



Solid Fiberite case for Pearce Duff's custard powder in cartons.



The 'Sell-Pack', a development of the cell-pack with a special tearstrip opening for smart presentation and sales in retail shops. This tearstrip removes the top of the box cleanly, permitting sales direct from the box without wasting time by stacking the apples. Now in use by Checkers Limited, a subsidiary of Louis Reece Limited, the 'Sell-Pack' is printed overall in a striking two-colour chequered pattern.



Metal lined wooden packing case for export duty. Suitable for hygroscopic consignments which need protection from moisture.



The carry home turkey packing case.

These six pictures illustrate the make-up of a heavy duty export 'No Nail' container—a type of box now becoming increasingly popular.



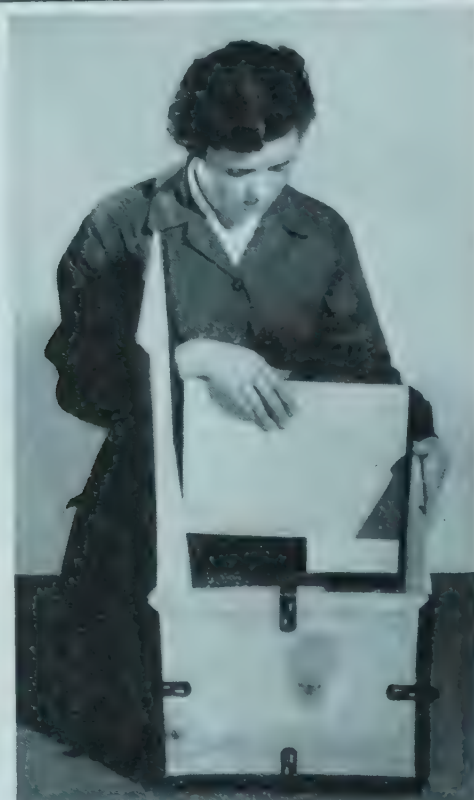
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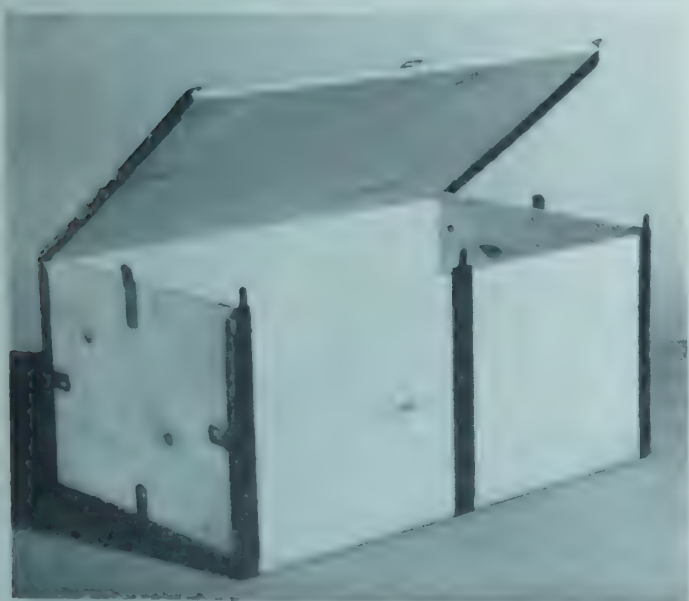
Stage 2



Stage 3



Stage 4



◀ Stage 5



Stage 6 ►

Some Prominent Case Users

The fibreboard corrugated packing case has a special application in the food and beverage industries for packing glass, tinplate, cans, plastics and other packaged products enclosed in containers of various kinds. Three-quarters of the total output of biscuits baked or produced in the U.K. are pre-wrapped in consumer packs of foils or films, greaseproof wrappings and nearly all this volume of produce travels from factory to retailer in non-returnable, one-piece corrugated containers or packing cases as they are now termed. The standard case is designed to hold 18 $\frac{1}{2}$ lb. packs of wrapped biscuits. The rigidity of the board and the firm platform provided by the glued closure flaps permits stacking to a height of 12 or 14 cases without the risk of breaking the contents. Such cases have their vertical sides joined with moisture-resistant tape and the lid and bottom flaps sealed with various grades of self-adhesive or gummed kraft tapes. These closure tapes are now applied by mobile hand strapping machines. Modified microcrystalline wax applied to the inner surface of a one-piece case seals off the contents from water-vapour without adding very much to the cost of the packing case. In the case of soft dense products such as flour, a flexible unit package, the packing case has to be designed to give the tightest fit.

McDougall's for example seal their one-colour printed case with an automatic glueing machine. The case itself contains one dozen 3 lb. bags of flour. This method of packing is found to be ideal because it groups flexible bags into an easily handled and stackable unit.

Wrapped or cartoned goods travel safely in packing cases where there is a gap between the inside closure flaps. With heavier goods, e.g. canned condensed milk, there is a risk that part of the load may shift in transit and fall between the gaps separating the inner flaps of the case. Label-rub is another form of damage which impairs the presentation of the packaged product for display purposes. Such problems may be solved by extending the inner flaps so that all four flaps meet, or nearly so, in the middle. Besides giving a firmer closure, this type of case has a double thickness of board over all or most of the base area.

Twin-board packing cases are now widely used in the export of such food products as semi-liquids in order to afford added protection where conditions of rough handling may be encountered. Pressure may come from the inside or outside of a case and these conditions are taken into account in case design. A polythene film bag placed inside the case is filled with semi-liquid cooking fat at blood heat. Normally the weight and softness of the product both during filling and when it has become set would tend to bulge the walls of the outer case. A double thickness of corrugated fibreboard holds the weight and keeps the case in perfectly rectangular shape for both loading and stacking.

Easy-to-tear Opening Devices

Easy-to-tear strips which divide packing cases in two are being adopted by an increasing number of food packagers and an example of this is Shippam's pack—four display cartons each holding one dozen 2 oz. jars of minced foods

in their specially designed easy-to-open outer which, when opened, forms two units each holding two dozen. This method of filling is of considerable assistance to the wholesaler in the general distribution of such products. Two-colour printing with a changing second colour identifies the various kinds of foods. Special types of cases for butter with a filling of 56 $\frac{1}{2}$ lb. packs which open each end enable both halves to be used for counter displays. The tear strip device has, in such cases, the added advantage of ensuring that the contents are not damaged by careless opening with a sharp knife.

Types of Fibreboard Corrugated Packing Cases and Containers

The conventional types of packing case popularly used by the packing and packaging industries consist of:

- (a) One-piece or the folding freight case.
- (b) Open-top trays for products.
- (c) Case and containers with wooden ends.
- (d) The two-piece or box and lid style.
- (e) The sleeve and tray types.
- (f) The popular pull-through carton or box.
- (g) The tube and slide.
- (h) Folders of various kinds.
- (i) Die-cut boxes.

A brief survey of some of these types may be useful here and while all are in daily use for some form of packing in the food and beverage industries, new developments, applications and variations of type are worthy of some special reference. Among current refinements to case making are perforated holes, carrying handles, sectional devices, tear strip facilities, and fibreboard surface coatings.

Wood Frame End and Recessed Packing Cases.—Added strength and support may be given to the corrugated case by the application of wood frame panels inserted into position at the ends of the case. There are several variations of the application of wood panels to cases and these have a relationship to the trade using them for packing. Such cases are made up by stitching rectangular pieces of board to the wooden frames.

Sleeve and Tray Type Case or Containers.—The make up of this type of protective case is a rectangular sleeve, combined with two shallow trays stitched to the sleeve, thus forming the base and lid of the container. In some instances, lids and bases are sometimes made up in the form of solid-bottom interlocking trays. Some form of strong closure is necessary such as tensile steel strapping. New forms of fibreboard cases such as merchandising units and die cut boxes are frequently being developed.

Open-top Trays.—This type of case is designed for use where it is possible and often desirable to leave the contents to view. It is favoured by the railways as a case or container for bottled products as it gives complete visibility of packed contents. Such cases are sealed only at the base and need half the usual number of glueing, stitching or taping operations.

Except for the fact that it has no top closure, the tray is substantially the same in construction as a one-piece case. It is set up by tucking in the four scored top flaps and locking them with each other so that they lie flat against the inside of the walls. It makes an ideal unit for display. One effect of this method of erection is to make the rim of the case strong and square enough to permit stacking to a good height despite the absence of a flat lid. Another facility is to give a double thickness of board on all four walls, with the extra rigidity and resistance to bulging which that situation implies. The strength of the bottom closure can be adapted to particularly heavy loads as with the one-piece case, by making the inner flaps meet or the outer ones overlap.

Most open-top trays are used as outers for products packaged in bottles, glass jars or earthenware containers. A typical tray would therefore be fitted with internal divisions. Rounded hand holes are cut in each end of the case during manufacture to make it easier to carry when full.

Some examples of users of these cases are jam and fruit drink packagers. They use open-top trays for three very good reasons. First, the open design of the case displays the fragile load and encourages careful handling. Secondly, the fact that the number of units in the tray may be checked at a glance, appears to deter would-be pilferers. Thirdly, with no-top closure the case may be quickly filled and does not need to be cut open for removal of the contents. Internal divisions separate each unit, jar or bottle and the risk of breakage is thus considerably lessened. Sometimes the robust construction of the open-top tray and the ease with which bottles are removed and replaced after demonstration at the point of sale, encourages the retailer to use such cases for returned empties. Certain manufacturers of such cases have taken this into account and their answer appears to be an all-corrugated reusable bottle crate with double thickness divisions and walls and a three-layer self-locking base, extending outer flaps being pushed up through the inner ones and folded back on themselves. Such crates are made from weatherboard which resists wet and damp conditions and is strong enough to be loaded and emptied on automatic crating machines. An alternative version used by one large beverage packager is a stitched corrugated tray with plywood divisions supported by metal rims and uprights.

Pull-through Packing Cases.—The main function of this type of packing case is to group packaged foods or beverages into unitized loads for shipping in multiples of a given number, say one dozen in a master outer—usually a one-piece case. Its design is simple and is based on two scored sheets of corrugated board, one sheet being stitched or taped at the corner to form a rectangular body and the other attached by wire stitches to the front panel; its free end is pulled through the body and tucked in at the front to give a flat base and lid and an extra thickness of board on two sides of the box. Despite the apparent looseness of the construction, pull-through cases are suitable for stacking, especially when they are filled with a fairly solid load of jars. They are delivered flat and do not need to be sealed when enclosed or grouped in a master packing case.



Liquids are shipped in bulk in plastic inner containers carried within fibreboard cases. (Reed Corrugated Cases Ltd.).

There are other special types of slide boxes, fashioned after the match box style with pull through facilities but these are in the main designed for unit articles. Double-cover boxes are made for products which are too large and heavy or too variable in size and quantity for packing in one-piece cases. This type of case is suitable for palletized loads and easy conveyance. A word may be said here concerning the use of the fitted case for packing machinery, equipment or apparatus for the food and beverage packaging industries. Such equipment may have nozzles, handles, levers, knobs and other obtrusions which must be fully protected when packed. Corrugated cells, wads, pads, cushioning materials fitted into tailor-made packing cases are the answer. Cellulose tissue and globular-embossed strawpaper are frequently used to prevent abrasions to fine polished surfaces when packed and to separate a number of fragile units.

Box Lids.—Shallow rectangular boxes with lids covering the full depth of the body are a much favoured style and are made in a lighter weight board material. The new poultry package is an example of the application of this type of packing case. Both sections of such boxes are made to self-lock, each part being delivered flat to the poultry farmer or packager. In the main, wire stitches secure the corners, forming a tight-fitting lid and base which give a double thickness of board on all four vertical sides and which in most cases need no further means of sealing. An alternative form of the box-lid case or container has a deeper base with walls only partially enclosed by the lid. The development in the packing case for all kinds of poultry and game continues to make rapid progress and many new types may be forecast for these popular table delicacies.

Cases with divisions are destined to play an increasingly important part in packaging bottles and cans of every kind. Of the several basic styles of internal fittings, divisions are the quickest to set up. Their job is to protect each unit from contact and possible breakage. Wine and spirit packagers favour this type of packing case, and this is one example of the departure from the former wooden crate used for the home trade. The export case for Vat 69, for example, adapts the principle to the distinctive shape of the bottles, which are placed one up, one down, so that they can be packed tightly into a relatively small outer. The result of this construction, it is claimed, is less board and less freight space and corresponding charges. Fret sawn neck fittings of wood and corrugated are also used to hold bottles firmly in position.

Cases for Food Produce.—Some reference has been made to the packaging and packing of such items as fresh fruits, vegetables, frozen turkeys, poultry, apples, strawberries, cucumbers, bananas, potatoes and cut flowers in special types of fibreboard corrugated packing cases. In these packaging operations, due regard must be paid to the nature of the product and advice may always be sought as to the best type of case to use for the particular item. Retailers are demanding a clean, uniform, attractive and easy to open case and one which is non-returnable for many kinds of fresh fruits and vegetables. Eggs are now brought to market in special cases of 30 dozen standard and large eggs. Moulded trays are employed as cushioning material which are light, durable and avoid breakage. The British Egg Marketing Board has made recommendations relative to both cases and methods of case closure. These are dealt with in Chapter 14. Wooden cases for eggs are now replaced with a one-strip corrugated fibreboard packing case which fully protects the contents. Their scheme became fully operative in 1959 and it now absorbs more than 20 million packing cases per annum.

Diagonal packing cases for apples, similar to that illustrated, are made to accommodate fruit of varying diameters without affecting the overall size of the case. Various sizes are made, one of the half bushel and the other a one bushel case. The rectangular body of the packing case is formed from a scored sheet of twin-board with a tape seal



Fibreboard packing case—filled and collapsed.



Part of the wide range of die-cut patterns which can be produced in corrugated fibreboard, making attractive merchandising units.

at one corner and suitable number of ventilation holes.

At one time, the Christmas turkey was delivered in large wooden crates holding some ten hens and eight cocks. Today, they are despatched and received frozen, vacuum packaged, oven ready, nestling in wood wool in some suitable type of colour printed carrier carton. The insulating properties of corrugated fibreboard keep the birds farm fresh in their frozen state during 72 hour journeys by road or rail so that the retailer may load them into deep-freeze and hold them for long periods ready for seasonal demand without the risk of spoilage.

Cucumbers are another example of specialized packing case application as these have always been packaged in wooden trays with a shock absorbing lining of straw. The new fibreboard case is self-locking, the lid and base coming together when the case is filled. Dyed tissue may be used as a shock absorber and to assist in retail display and sale. The cases are non-returnable and this saves book-entries.

Corrugated cases are also used for the purpose of distributing day-old-chicks—usually in batches of 50—and such cases have to guarantee an exacting low rate of chick mortality. These cases separate the chicks into two groups of 25 and have stitched die-cut fittings. Sloping walls ensure that stacking cannot be so close as to shut the chicks off from air flow. Legs slotted through the bottom wall keep each case well apart from its neighbours in a stack to prevent build up of heat generated by some 50 small bodies.

The packing of fruits, tomatoes, etc., in corrugated packing cases saves much time and labour as gummed

kraft tape or printed bands only are needed to secure the packaged box.

One-piece export cases fitted with individual cells, avoid the need for tissue wrappings. Coloured labels or bands may be used to code or brand a grade or group of produce. Internal linings of blue kraft afford an attractive background for display purposes.

Merchandising Units.—This is a new development of the packing case where it may be additionally used as a display piece from which units may be sold at the point of demonstration. Where a new product, a premium offer or a national advertising campaign is organized for a food or beverage product, such a case can fill an important part of the planned campaign. The goods are not placed on the shelf but are displayed and sold from the packing case which announces the product boldly to the shopper.

The specially finished surface of the modern packing case permits first class colour printing so that sales messages, brand names and prices may be printed boldly for all to see while the case is displayed. They are ideal for self-service stores. Two broad categories of merchandising units are floor stands and counter displays. Beyond that, although the die-cut blanks vary widely in detail, they can be grouped into a handful of basic styles. Floor stands used for tumble-displays of canned foods and similar products, are made in three sections—a stitched body, a tray or bin to hold the units or goods, and the cross members supporting it. Units in which the front wall is broken and recessed to form shelves, sometimes with upright divisions, can be supplied in one piece or with shelves as an extra internal fitting. Most styles are usually crowned by a printed white-lined headboard. Most counter units ring the changes on a solid-bottom tray with scored flaps extending upwards. Like floor stands, they display their contents either from a flat bin or in stepped formation on shelves. In some forms they link the duties of a showcase with those of a shipping and retail case; goods need not be unpacked at any point in the chain of product distribution. This type of unit is made with either a separate or an integral lid which swings or tucks back to serve as a printed crowner. Contents are usually located by a die-cut sheet. Blanks incorporating a carrying handle offer added convenience and sometimes after-use facilities to the consumer.

Some outstanding current examples of the merchandising unit in use and on display in the retail store is the Heinz Please Serve Yourself unit which combines impact with economy and convenience. Printed in red, black and yellow with good design, the unit tempts the consumer to try out those brands which have hitherto escaped attention. The average 3 ft. 4 in. tall merchandiser attracts attention while on display. It is here that the ingenuity of the specialist designer comes into being and is matched by the enormous range of die-cut patterns which can be produced in corrugated fibreboard. A problem was given to one large packing case maker to produce an inexpensive display for canned cat food. The answer came with a gaily printed sleeve and headboard round an existing one-piece outer. Board

material is thus saved, the unit being simple to erect and such a case may be re-filled as and when required.

Single-faced Corrugated.—This material is used where packaging duties are too light to justify the use of a double-backed corrugated fibreboard packing case. It is made in either coarse or fine flute and is converted into various forms of containers, sleeves for bottles, die-cut sheets and folders, scored fittings and stitched cartons and boxes. In each case, it is designed to strike a precise balance between adequate protection and economy. Kraft backed and white machine glazed corrugated grades are the most versatile of the types now available to the packager. Corrugated straw-paper is used mainly to prevent abrasion where required in packaging and to give a cushion effect to products with fine surfaces, such as equipment or even gift packages and fancy printed containers. A corrugated case which does more than it was primarily designed to do may be an inefficient package in that costs of production for unnecessary features have been excessive. Filling, sealing or handling have a direct relationship to the design and style of the case.

Some Important Hints to Case Users

Specify in full the size, shape, weight, fragility, production methods, handling at all stages, transport methods and marketing of the product to the case maker specialist. Preferably send a complete set of units to be so packed. Choose a rectangular shape for convenient handling and check up freight regulations where they may apply. Before specifying, review the packaging operation for weak points and any opportunities for greater mechanization. Some slight adaption to a packing case can assist in better filling and sealing techniques. Do not overfill or underfill a packing case designed for a specified number of units. One fault—overfilling—will cause the case to burst open and invite the attention of the pilferer and the other will cause a rattle and possible breakage of glass in transit.

Case Sealing.—Methods of sealing by adhesive, staples, gummed kraft tape, etc., are outlined in this book. Where adhesive is used, spare the glue. More adhesive does not mean a better bond. A wide brush or roller is better for good adhesive coverage. Any worn coating equipment should be replaced. Gummed kraft tape should be adequately moistened. Too much moisture will wash away part of the glue coating while too little will hardly activate the glue. Moisture is best applied to adhesive surfaces with brush moistening automatic sealing machines which control the even flow of moisture over the glued surface. When the weather is cold, some warm water added to the tank will help to break up hard glued surfaces and render them more pliable. An adequate overlap of glued tape beyond the seams at each end of the case is very important as it assists in a strong form of closure.

Where wire stitches are used, they should not be spaced more widely than advised. Where cases are reinforced, should this be necessary, flat steel strapping should be used rather than wire as this may cut into the edges of the case.

Straps should be tightened so that they grip but they must not cut into the shoulders or edges of the case.

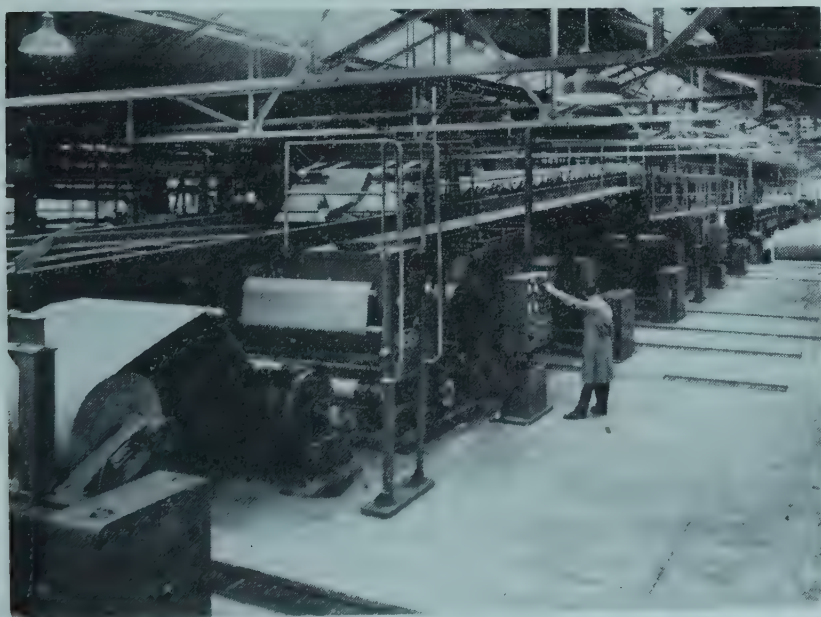
Packed cases should be stored away at an even temperature. They are best stored on pallets off cold stone floors and in this way they are mobile by the aid of a trolley or truck, and easily removed when required.

Stacks should be of uniform size and tightly packed. Cases are best spread evenly by vertical stacking; interlocked or staggered so that the load is distributed; it is best to anchor heavy loads for safety. Printed cases should be visible and stacked printed side outwards for easy identification. Coloured self-adhesive code labels may be used to mark batch or making stocks. Gangways should be left so that stacked cases are not hit or broken open by passing trucks causing case movement or breakage of contents while in store.

Packing Case Manufacture

An outline of styles, shapes and applications of standard and tailor made fibreboard corrugated packing cases has been given. In this country, new machinery enables the case maker to mass produce raw material for conversion into any kind of packing case or container. A short review of current case making methods will no doubt prove of interest to packagers and users of various kinds of boxes, cartons, cases and containers made up from this very versatile material.

Very considerable skilled engineering is necessary in the manufacture of the fibreboard corrugated packing case to fit it for its job and its task is based on a familiar principle; when two strong surfaces are held apart by a firm structure, the result is far more rigid than the sum of the three constituent parts. Rigidity is the essence of the fluting. It is not there to act as a cushion, although resilience is a useful minor property. The walls of a case must be sufficiently stiff so that they do not bulge or sag under compression from a stack or the weight of the contents. This is only one effect, even if the most important, of sandwiching corrugated paper between strong kraft liners. The composite material is tough and light as well as rigid.



Langston Masson 85 in. corrugator viewed from the single facer end.



Folded single-faced board prior to its entry into the double-backing unit. The corrugated single-faced paper board is carried mechanically forward to the final stage of its transition into a rigid board, where an outer lining of kraft is bonded to the exposed flutes (or corrugation).

Unlike solid board, it does not depend on mere thickness for its strength. Also unlike timber, it is consistent in quality and has a precisely known level of performance. Different duties are served by varying the weight of the liners and the profile of the fluting. Two basic sizes of corrugations are now in common use. What is termed 'A' flute board gives a greater beam and compression strength because its surfaces are more widely separated. The alternative 'B' flute has contours which are shallower and closer knit. Case users are familiar with these well-known grades of fluting. 'B' fluting offers strong resistance to crushing, and at the same time, helps to keep down freight and storage charges by reducing the bulk of the case. Where exceptional rigidity is needed both styles are combined to form twin flutes or double wall board. Liners can be made weather-resistant or laminated with bitumen, aluminium foil and plastics to improve the barrier properties of the material. Anti-skid treatments and wax coatings can be applied. Dyed and bleached kraft liners make a colourful background for surface design.

With these first class materials and coatings, the specialist who designs the ultimate fibreboard corrugated packing case applies basic engineering principles and an expert knowledge of the properties of the material used. Not the least important is the skilled artist who formulates the design incorporating all the necessary features for product security, surface printing and other details likely to assist in sales. A case is therefore made to match exactly the packaging needs of the contents.

In one large case making organization, one corrugator produces enough board in a week to make more than a million cases of standard or average size. At the start of the run in board manufacture the paper for corrugating passes over heated rollers to the steam shower which softens it for the corrugating process. As the fluted paper emerges from the lower corrugator roll it is tipped with adhesive

and joined by its crests to a tough web or kraft liner. Then it moves on to the double backer section where a second kraft liner is bonded to it to form a hard, rigid board. The finished board is scored and cut in one direction on the corrugating machine—the final stage of the board making process. Use of two cut-off knives enables a number of orders of different sizes to be handled at one time. Productivity thus keeps down costs. Slitting and scoring shafts are arranged in three's so that one pair can be set while the corrugator is still running. As the board races overhead, a mechanic prepares the machine for the next batch of orders.

From the corrugator the scored blanks travel by roller conveyors to a battery of printer-slotter. By the time they leave these machines the case making process is complete except for folding and jointing. Two or more colours are applied by a rotary letterpress technique using rubber or plastic stereotypes. After the printing cylinders come the slotting and scoring shafts where blanks are cut to shape and trimmed. The case blanks are folded and joined with glue or reinforced tape at the rate of up to some 8,000 an hour. The method is to turn the two outer sides inward and bond them under pressure. Folder-stitchers work on much the same principle but have less than half the output. Any shape which is too intricate to be handled by fast running printer slotter is stamped out on dies by powerful presses. Separate machines are used also for automatic production and assembly of divisions and other internal fittings.

All corrugated fibreboard packing cases and containers are rated to give an exact performance and must be sampled at every stage. Testing begins with the measurement of caliper as soon as the material emerges from the single facing unit. The flat crush resistance of the board is the yardstick of its ability to withstand pressure across its thickness. This instrument takes a sample of predetermined size and crushes it until the flutes collapse. The pressure thus obtained is recorded on a dial. It is also important to know how far a packing case will resist puncturing both from inside or from sharp and heavy articles outside. Pressure from an angular head gauges this adequately. As the flat crush tester, a dial reading indicates the measure of resistance. Compression tests are used partly to reveal flaws in the construction of a case and also to estimate the weight of stacking it will bear. A graph taken as the load is applied enables reasons for any failure to be explored. One of the main tasks of a corrugated case is to shield its contents from rough handling both in transit and in store. The inclined plane test reproduces some of the hazards by sending filled containers or cases at full tilt down a sharp ramp. Drop tests show the extent to which they will stand up to blows at the corners and edges—a property closely linked with the compression strength of the board. Everything is done practically and scientifically to ensure that the food and beverage packager obtains complete satisfaction from the use of the packing case and it is only by free consultation that any special feature may be discussed and a suitable type of case formulated. Each case is built round the product and not to any abstract ideal of performance. There is one field only and that is the packing of produce where standard cases are made to a specification. As an example, a case for

breakfast cereal demands just as detailed a study of the factors involved, i.e. size, weight, character, value, method of production, marketing and distribution; the needs of the retailer and the ultimate user—as is the case of a packing case or container for a valuable porcelain dinner service. The aims are much the same in each instance, the contents must be protected, identified quickly, handled conveniently and at minimum cost. This can mean that the packager can take, in the literal sense, a calculated risk; if a product is cheap it is often more realistic to allow for a known percentage of damage than to increase the strength and the cost of its case. When the testing sequence shows, conversely, that the contents need more protection at a given point, a simple internal fitting will provide it.

Advertising the Product

Many colourful and striking die-cut merchandising units are to be seen on display. Often the label on the packaged product can be reproduced on the packing case or merchandising unit, thus emphasizing the brand name to the public. A recent development in letterpress printing on plain and coloured corrugated board, partly through the use of specially formulated inks and re-designed printer-slotter, has given an entirely new angle to the one-trip fibreboard container. A colourful and well-printed case or tray becomes a travelling salesman for the manufacturer, merchant of packager of the product. Printing in this instance means protection of product plus publicity. First class effects up to 15 colours may be obtained on four-coloured presses by over-printing. The degree of clarity and the close register now achieved on the surface of case material is comparable in some instances with the best types of lined or coated board. Most users of this type of case make use of tinted or bleached kraft to give added impact or individuality to the surface design.

Cushioning Material

A series of cushioning and wrapping materials have recently been introduced which have applications in the food and beverage industries. Pillo-pak, Pillo-flex, Pillo-kraft and Pillo-proof are strong, spongy, materials, some of which are corrugated, reinforced and have special shock absorbing qualities in addition to being waterproof. A super-wrap reinforced waterproof paper, a new versatile material, may be described as a three-in-one packing material with spun fibrous reinforcement. This material is very tough, pliable and suitable for use in conjunction with case lining, heavy duty bulk merchandise wrapping and for covers while goods may be exposed in storage. More details of these and similar wrapping materials are given in Chapter 4.

Corrugated wads, pads and sectional material may be obtained where additional protection may be required for packed products.

Carton, Container and Packing Progress

Self-sealing cartons have been in use to a limited extent in recent years and users of these cartons are finding that they combine the best features of the glued and lock-tab

types without any of their drawbacks. It is generally accepted that a latex coating which will stick to nothing else but itself is applied to the infolding corner tabs of the carton when the initial blanks are printed and in this case, they need only to be pressed together to produce the ultimate tray or lidded container. This is said to be a quick process saving time and labour in case make up and time spent on erecting pre-glued blanks by hand and to avoid corner 'play' which often robs lock-tab cartons of rigidity. This is a problem which can upset the even flow of automatic overwrapping and closing operations. No less important for users interested in sales appeal is that there are no slits or tabs to break up printed surface designs. These new advantages may have a special interest to biscuit, meats, sweet and allied food packagers. Frozen foods may be a useful outlet for this form of closure as waxing or lamination of the entire inner surface does not affect the seal. This device has been introduced by the Loppac people of Leeds and the designer has recently gone a stage further by introducing a carton which may be completely sealed at all points and coated with plastic on the inside in order to provide a sift- or leak-proof package for powders, granulated items and semi-liquids.

Wooden Cases, Crates, Containers, etc.

Fibreboard material is now popularly used in conjunction with wood and plywood giving additional support to paper based board material at vulnerable points, in particular at case ends. At the same time, a high volume of timber is used, particularly for overseas packing and in addition to standard wooden cases, specifications and additional tin lining or waterproof liner facilities are supplied as required. There are, however, considerable losses annually in damage to consignments, and it is pointed out that such claims could be avoided if efficient cases were made to suit the product thus packed. Defects in timber, bad nailing or closure, decay and knots can cause damage to packed contents. Green or wet timber or grades that are brittle should not be used for packing medium to high cost products. From the packer's point of view, there are some important factors to consider where wooden cases are employed in the despatch of food and beverage products. The importance of the well-nailed case cannot be over-emphasized. Nails that are too long, too short, too thin or too thick should not be used for case closure. There is a correct number and place for the nail; they should not be overdriven or placed too near the edge of the wood.

Plain bright round wire nails or cement coated nails are recommended for good service. Such nails are dipped in hot resin and when used after cooling, leave frictional coating which provides a good holding power of some 40/100 higher than the plain nail. Shock or impact does not cause such nails to spring out of their position in transit.

The clout nail is recommended for nailing plywood material. Case dimensions and its packed weight will determine the number of nails to be used for firm closure in every case. Tests have shown that from 4 to 6 in. apart is a fair average for safety.

Dowelling provides added strength to the wooden case.

The tongue and groove method of case making is being replaced with butt joints reinforced with metal dowelling. These metal dowels give added strength to the panels and afford an anti-pilfering device.

Tensile steel strapping may also be used to afford added strength and pilferproof properties to the case. Where possible, nails should be staggered and this will prevent splitting the wood.

'No-Nail' Plywood Containers.—There is much to be said for this well publicised type of container or case. The 'No-Nail' is a patent device which employs plywood for the panels where heavy contents are involved. Attached to these panels steel strips are fitted to provide both strength and rigidity. The containers are delivered conveniently in a collapsed form and are easily assembled. 'No-Nail' containers are also made up from fibreboard and other strong heavy substance paper based board material for the panels.

Casks and Barrels.—This subject has been discussed in Chapter 1, metal being the basis of such forms of container. Hard woods, such as ash, chestnut and oak, are used in the make up of the barrel which is made of staves, arched vertical uprights which form the wall head, rounded wooden ends and steel hoops. There are two main varieties—wet and dry. Casks and barrels are also made from plywood being used for dry materials and liquids, providing they are first packed in liquid-tight containers, as for example, metal liners, iron drums or jars. These barrels may be made siftproof for fine powders if so specified. The use of an inner bag liner of some kind or a lining of strawboard sheet metal or similar material may be incorporated in the make up of the barrel, thus rendering it entirely siftproof. The barrel consists of a body and two ends all made of three-ply reinforced with wooden body bands.

Wicker Basket, Chip Punnets.—These methods of packing and packaging have a special application in the food, fruit and vegetable industries where they are still used despite the development of new materials. Seasonal gift hampers of fruits, foods and table delicacies are still popularly packaged in the wicker basket or hamper. They have the advantage of being light in weight and may be subjected to rough handling without damaging the contents. There is a variety of forms and styles but special shapes may be made to suit the produce where quantity permits of a making order.

Many of these baskets and hampers may be used time and time again and this in spite of outdoor usage, rough handling in the market and exposure to all weather conditions. Another name for these containers is skeps or skips. Wicker baskets and hampers are made complete with cane or rope handles, woven into the container. Handle carrying devices are an alternative method of handling and carrying.

Carboy and Glass Baskets.—Some baskets are specially designed to the requirements of a trade, particularly liquids. The porter basket carries six or 12 quart bottles, and the

wine basket, which is a hamper, is designed to take from one to three dozen pint or quart wine bottles. There is a lightweight glass basket constructed to hold up to 60 glasses and another variety of strong basket with divisions made to hold half gallon and gallon jars. The carboy basket is a strong coarse slewed basket made to protect glass holders of chemicals and the can basket which is made either open or covered. The inner glass or earthenware vessel is amply protected, the wicker covering the neck or shoulders of the jar or bottle. Some of these containers have an application in the wine and beverage industries, and are also used for holding certain liquids in the food manufacturing trades, but their use and application is limited to certain trade uses.

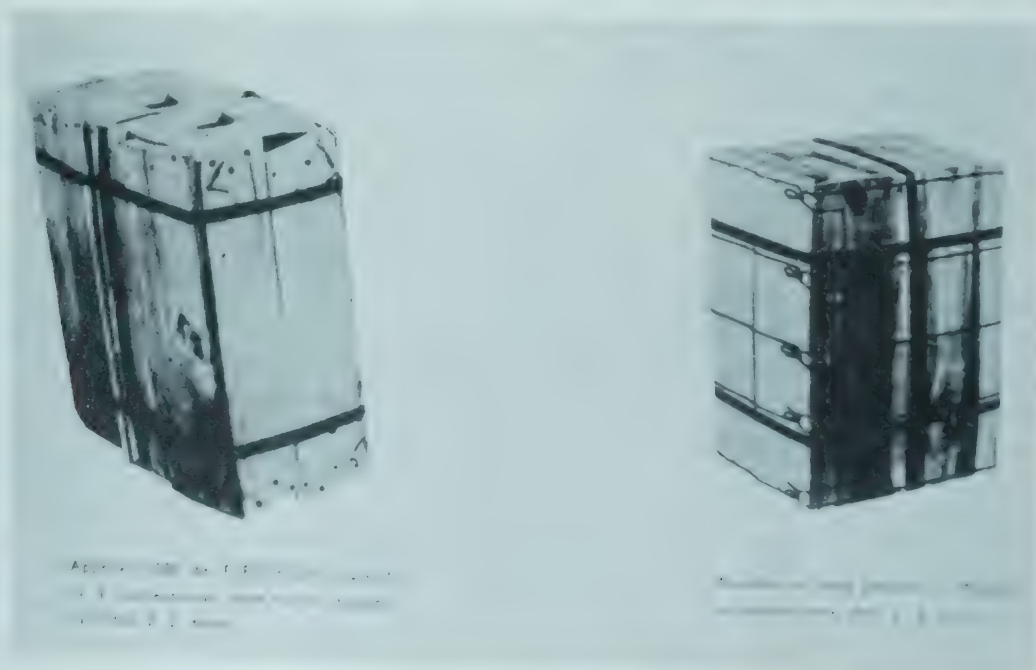
Fruit and Vegetable Baskets.—Fibreboard corrugated packing cases are now made for almost every kind of fruit and vegetable produce, such cases being made with the necessary vent holes, carrying handles and inner decorative, protective or wrapping paper or tissue. However, baskets for fruit and vegetables are still in popular use and among the types are the rim peck, the Worcester pot, the strike, the 'flat' and the wicker handle baskets. The strike is in the form of a cylinder somewhat similar to the sieve and the half-sieve types. The bottoms of these types are slightly raised at the centre and the border section being thickened outwards. The cubic content of the sieve is approximately one imperial bushel and the half sieve half this weight or volume. The strike capacity is one quarter of an imperial bushel. This latter type of basket is used, in the main, for soft fruits, cherries and plums. Other shapes in the strike series have a rim thus affording more protection for packaged fruits. The Worcester pot or half pot type is mainly used for vegetables and the baskets are rectangular with vertical sides. Baskets with handles present a problem in stacking and care is taken to prevent damage to packed contents. The wicker basket has a handle with lid coverage and the 'flap' is also made with a hinged lid and is used for packaging grapes, cucumbers, etc.

Chip Punnets.—This is a popular type of small veneer basket made in round and square shapes and used for water cress and soft fruit packaging. There are a limited range of sizes, three in all, used for mustard and cress (2 oz.) fruits ($\frac{1}{4}$ lb.) strawberries and raspberries ($\frac{1}{2}$ and 1 lb.). These baskets are hand woven and machine stitched. There are no handles so that they may be stacked easily and have a fair strength to sustain normal stacking weight.

Hampers.—Reference has been made to the seasonal gift provision hamper which is a square container and, in some cases, a basket type of vehicle. Handles are at each end for ease of conveyance. Meat hampers have wooden battens on the base of the hamper to provide some strength. They may have galvanized bands on the lid and facilities for name and brand name or mark of the packager.

Crates.—The fibreboard corrugated crate is rapidly replacing many forms of wood and allied material used for crate make up. Bulk, cost and the problems of returnable empties often lead beverage packagers to the use of the fibreboard crate as opposed to wood. However, the wooden crate often has a long life and may be subjected to severe wear and tear during its life. The average crate is strong in construction with good sectional facilities. The crate is kept rigid by spaced struts, braces and corner pieces. First, there is the framework and the edge member, the parts forming the edge of the made up crate. The diagonal braces can be applied to any or all of the faces of the crate, at an angle, between each individual member. Slats are used to break up the span, the span being the distance between slats or edge members and the slats. First class wood is used in the make up of the crate, the wood being free from knots and decay. Good surfaced wood which assists in case formation or nailing is most important. The type of beverage or bottled product will determine the grade of crate to be used and here again, some advice may be sought from the crate maker.

The 'Mussy' wire wound boxes.



Choosing the Right Wooden Container.—Whether it be wicker, chip, plywood or wood, fibreboard corrugated or other material, each and every foodstuff or beverage presents its own individual problem and the ultimate material and the design of the container is therefore influenced by the product. Shape, size, weight, value of the unit, liquid or semi-liquid, solids, cans, bottles, fruits, vegetables, meats, poultry, destinations, ability to withstand shocks or compressions, the method of filling and handling all have an influence on the final container and its design. The use of paper shavings, wood wool, pads, wads, cushioning materials, straw, sawdust, expanded rubber, felt, cellulose shavings and waddings, all of which are termed shockproof packaging materials, have to be taken into account in some processes of product protective packaging. Prototypes may be made specially so that tests can be carried out under field conditions to determine the right shape and medium for the product

Wire Bound Boxes

A new type of wire bound packing case which can figure largely in the packing of food and beverages, etc., for export is now available in England. Used in the first instance in the U.S.A., and in some continental countries, these new packing cases consist of boards or slats of wood, relatively thin in weight, but very tough, linked together with steel wire stapled to them. These boxes or cases are supplied flat or collapsed thus taking up little storage space while

awaiting filling and when required, they may be easily conveyed to the production line as they are light in weight and do not need mechanical handling devices to move them. They are moulded into shape by hand in seconds by using a simple tool which locks the fastener loops which are part of the make up of the case.

Nails are not needed and there is no noise in their construction, filling and final closure. There are no nails to be extracted when the consignment so packed arrives at its destination and in this way, they assist the buyer, user, retailer, distributor and others handling consignments of machinery and spare parts. These cases are very light and may be handled by female labour. The case is claimed to be a compromise between the high cost of wooden cases and the space they take up in store and transit. The relatively lower performance which may be expected of the fibreboard packing case, which in the main is designed to hold loads of up to 100 lb., makes them highly commendable as a new packing medium. It is also claimed by the makers that these wire bound cases or boxes are approximately some 30 per cent cheaper in price than the standard wooden packing case. With additional pads or fitments, they will hold delicate units and spare parts firmly in position. They are easy to carry as they are fitted with special handle carrying devices and they are safe in transit and store, they may be lifted with ease. Where goods have to be opened up and examined at the customs, they may be quickly reclosed without any bother.



The diagraph machine cuts out letters and numerals in metal, zinc or oiled parchment, normally used for stencil plate production. Where large consignments of goods are sent to a single destination, the master stencil plate obviates laborious individual hand written or typed labels for case addressing.

products requires a code or batch mark for immediate and quick identification, prior to the distribution in bulk to the distributor or retailer. Code labels in white and colours may be used to mark such batches of food and beverage stores. Often the first off the production line or older stocks must be the first out, new stocks being held to mature or await delivery instructions. Such batch supply organization may be carried out with coloured, code printed or numbered self-adhesive or tacky labels. Here again, this form of labelling may be quickly removed by peeling the label from the surface of the goods, no residue being left behind on the product. Other forms of labelling such as despatch, may be added in replacement where goods are passed for delivery or transit by road, rail, sea or air. Waxed cartons which often resist other forms of labels may be suitably labelled with pressure-sensitive labels.

Bulk Merchandise Labelling.—Specified numbers of units may be either bulk packed in kraft wrappings in the form of bales of all sizes, weights and shapes, or they may be packed in fibreboard corrugated packing cases, no-nail cases, wooden cases or crates or wicker containers of some suitable type which have an application to the product or the trade using them. Labelling here may be carried out by various methods. Kraft wrapped bales are best labelled with gummed labels or liquid adhesive and plain labels. Corrugated packing cases may be stencilled, labelled with gummed labels, or in the case of large consignments they may be printed on the surface of the case with the name and address of the consignee. Wooden cases, crates and similar forms of packing are best labelled with tie-on tags, seals, tallies, or

the name and address of the consignee being added to wooden surface by waterproof black stencil ink with the aid of a specially cut out stencil. Diagraph stencil cutting machines assist in the preparation of stencils which may be cut from oiled parchment or board and zinc. Where large and continuous consignments of goods are being bulk packed for a customer, a permanent stencil with name and address assists in speedy marking, coding or labelling of the batch.

Choice of Labelling Method

Here are some important considerations to be studied where labelling projects are to be carried out; in the case of the new project, tests should be made of materials and their applications to surfaces.

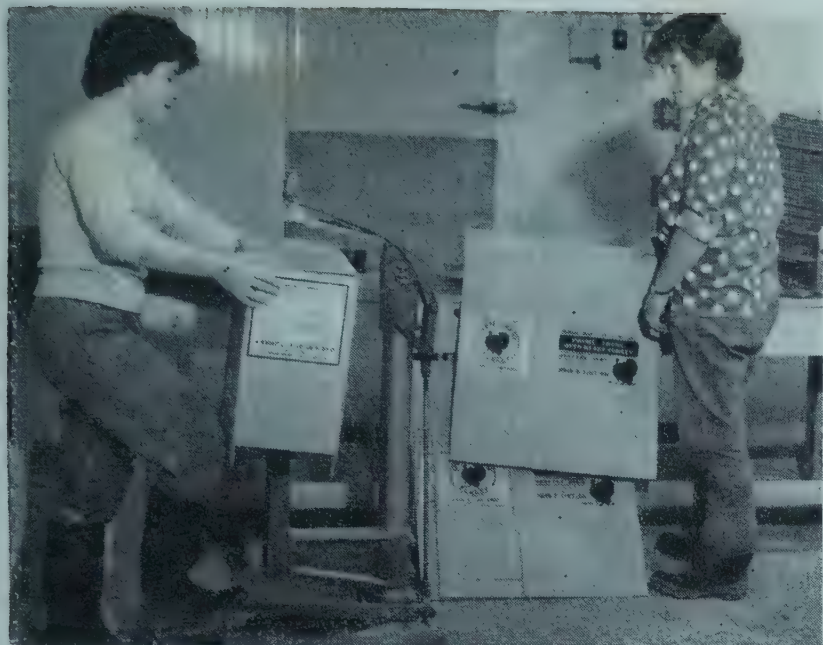
(a). Unit, case or bulk wrapping material often has an affinity for some individual form of labelling. Smooth, medium and rough surfaces often need average to tenacious forms of adhesive application either as liquid or as a label. The surface to be labelled therefore must be considered. Today, there is an adhesive coated label designed to adhere firmly to wood, tinfoil (plain, lacquered or printed) various types of transparent film, metals, aluminium, glass, earthenware, plastics and other modern materials used in packaged foods and beverages. The label may be coated with a suitable adhesive in the dextrine, animal or fish glue group, or may be pure gum arabic coated in one, two or three coatings; it may be a thermoplastic heatfix or heatseal label. The surface to which a label is applied must be carefully considered and the correct labelling medium chosen if the label is to do its job and be 'all there'.

(b). Often the quantities of units to be marked, coded or labelled may have some influence on the form of labelling chosen whether the operation is to be carried out by hand, semi-automatic methods or by machine. Mass-produced products need similar speedy forms of labelling and either heatfix or gummed labels are best for this operation. The method of filling the container or unit, the surface of the container, the quantity of units and the method of label application all have an influence on the form of labelling adopted.

(c). Mention has been made of permanent labelling where the brand mark becomes an integral part of the make up of the product, unit or container. There is very little choice here as this form of labelling usually calls for some form of tenacious label such as the transfer, heatseal or specially selected gummed recipe label.

Sealing Methods

Fibreboard cases and kraft wrapped bulk merchandise are best sealed with some form of glued adhesive kraft tape. Fibreglass, sisalkraft, and heavy kraft based tapes are all suitable for sealing and packing cases and bales of packed merchandise. In many cases, Trade Associations will recommend the form or forms of case and bale closure and this has some relationship to the weight, form and type of merchandise to be packed and sealed. The advantages of paper and cloth adhesive tapes are that they are easy to



The photograph shows the ease in which the collapsed food packing case or container may be assembled for packing and in this case, a foot treadle staple stitching machine is used.

apply and suitable taping machines or sealers are available to moisten and cut off the requisite amount of tape for application to the case or bale packed surface. Such tapes may be printed in colour with the packager's name and trade mark thus advertising the goods wherever they go. In recent years, self-adhesive tapes are being used for sealing packing cases and containers and these too may be applied by sealing machines which dispense the requisite amount of tape for the flap or bale end closure. Methods and machinery currently in use for case and package sealing are surveyed in Chapter 10.

Tags and Tallies.—Tags, tallies and metal seals are used in conjunction with a hand machine appliance so that strap, steel or taped cording may be secured with a seal which often carries a brand name or mark. This form of closure is a first class pilferproof seal for the package. Metal seals and labels are a practical and indestructible form of labelling and sealing consignments of goods; they are highly resistant to water contact, grease and dirt and may be printed with waterproof ink which renders the name and address weatherproof. Metal labels are suitably punched for the purpose of tie-on, either by eyelette or punched out slitting.

Steel Strapping.—Tensional steel strapping may be either flat steel or wire and either of these sealing mediums are applied to fibreboard or wood cases by suitable machines and are sealed or tied while under tension. Such materials should conform to the British Standard Institution Specification No. 1133. Really heavy loads may be secured together with a suitable number of steel bands and the number will be determined by the weight and bulk of the case or load. The use of tensile steel, does in some instances, facilitate handling on truck or trolley without the aid of the pallet or skid. Steel strapping of any type should not be applied so tightly that it cuts its way into the edges of the case.

In many instances, wooden cases are considerably

strengthened by the use of steel strapping and such material certainly assists in the prevention of pilferage.

Hand operated strapping machines of standard type are available making either a sealed joint or one formed by piercing or interlocking the bands. Such machines give a positive seal joint and are easy to handle, speedy in use and do not result in worker fatigue. Hand operated machines usually work in conjunction with wire from the continuous coil making a joint of the twisted knot type. Other tools are available for the application of flat strapping and circular bales. There are semi-automatic strapping machines which use wire or flat band steel tape. The machine applies the necessary tension electrically after its manual application to the case. There are new machines which work pneumatically or by compressed air. Where predetermined lengths of steel are required in case sealing, such machines are recommended.

There are some first-class fully automatic tensional strapping machines whereby the case or container to be so sealed is fed automatically to the machine by roller gravity or some form of power operated conveyor device. Cases are automatically banded and sealed. Current equipment in this field incorporates electronic or mechanical trip and positioning devices. Such machines must be supervised and maintained but the steel strapping coil holders, when changed, continue the work with an operator.

Without doubt, tensional steel strapping is best for various weights of heavy duty wooden cases where various types of steel strapping and heavy duty bands and wiring may be used to protect and contain the consignment in its travels by land, sea and air. Steel strapping does not in fact carry the full weight of the case or package; its main function is to hold wooden parts or commodities so sealed together for storage or transit.



A new hand-operated strapping machine used in conjunction with the application of self-adhesive pressure sensitive tape. The use of this portable and mobile hand machine enables the packer to seal case flaps securely wherever the cases may be stacked or stored. By a simple backward pull movement, a strip of tape is applied to case seams or flaps the exact amount of tape being dispensed.



The hot plate in use in conjunction with the thermoplastic label. Ice cream is being packaged and sealed with a heatfix label which has been pre-printed.

Staples.—Some reference should be made to this popular form of case closure which has some advantages over other forms of enclosing. Some food and allied trade associations recommend this method among others for the purpose of secure packing case sealing or closure. A whole range of stapling machines are available for the purpose of carton, container and packing case sealing. Staples should be well clinched, not too many and not too few. Their use in conjunction with the fibreboard corrugated container or packing case invariably renders the case unsuitable for re-use or return after emptying, the flaps or lids having been torn away to extract contents. Where packing cases are used for display purposes, some form of adhesive tape is best as cases may be opened by slitting the flaps with a knife without the necessity of tearing away stapled flaps. Labels may be attached to packages by the staple and they have an application in labelling wooden cases, hessian wrapped bales, and fibreboard cases where the label may be neatly stapled at all corners with a wire stitch. Here is a brief review of some stapling machines manufactured by McGarry & Cole Limited and marketed under the name of Bostitch.

1. The motorized F carton bottom stapler is an inexpensive machine for stapling bottoms of corrugated and solid fibre cartons. The low price brings this model within the means of shippers whose requirements do not justify the investment in a wire stitcher. It uses preformed staples in strips and is faster and more secure than other methods of closing corrugated shipping containers. No storage space is required for set-up containers; no waiting for adhesives to set. Containers can be stapled as needed and used at once. The top section of the bottoming post swings forward for easy insertion and withdrawal of box. The post straightens when the treadle is pressed, and further pressure drives the staple. The post may be locked in the stapling position. Girls operate this machine with ease and a variety of staple sizes will handle practically any thickness of carton materials.

Its rugged construction with heavy cast iron frame provides for long life in continuous use.

2. The T5-OC stapling tacker with outward clinch, automatically drives staples and turns legs outward to clinch under or inside the work. It can be used anywhere because no clincher or blade has to be inserted, and simplifies many fastening problems. A few uses for this new time-saving fastener are: (a) temporary sealing of containers for intra-plant shipments; (b) sealing seams of flexible corrugated wrappings on packages that are too long for a blade to reach; (c) assembling bracing or shock pads used in packing fragile items; and (d) tacking labels to corrugated containers securely without damage to contents.

3. The new pointed blade stapling plier model P6-8P is a low cost, powerful carton stapler that is held in the hand like a pair of ordinary pliers. The narrow blade is inserted through the container where the inside flap is folded. A simple squeeze of the handles drives and clinches a strong staple through inside and outside flaps. It forms a neat, secure closure and works equally well for bottoms and tops. The handy new Bostitch plier holds a strip of more than 80 staples and can penetrate two thicknesses of tough corrugated board. It is much faster than glue or sticky tape, and the staples will not cover up any message on the containers. It is ideal for mail order departments, parts warehouses, department stores and other multi-station shipping rooms—and in any shipping room where the volume does not justify investment in more expensive stapling equipment.

4. The D14 wide crown stapler is a compact, portable stapler available in hand-operated or air-driven models for top sealing full overflap, partial overflap, and flap, and practically any other kind of corrugated container. With the D14, sturdy wide crown staples placed at 5 in. intervals provide fast, economical carton closure. Three or four wide-crown staples completely seal a container customarily requiring 12 to 16 staples of smaller size. One gains faster sealing with fewer staples and less operator fatigue. No skill is needed. The machine is positioned on the box, the handle is pressed or the trigger squeezed, and the staple is driven and clinched.

Cordage.—Fibre cords and twines have an application in some forms of bulk merchandise packing. They are made from various grades of fibre in several sizes and vary in their make up from single yarn to multiple-ply cords. Users and prospective users of cords and twines should consult the jute, flax and hemp specifications laid down by the British Standards Institution (B.S.2570: 1955). These tables list descriptions, runnage, minimum breaking load per pound and minimum ply or number of threads. All three grades, i.e. jute, flax and hemp twines are made in various grades from extra coarse, medium to extra fine grades. Some advice may be sought and obtained from the fibre cord and twine manufacturer or merchant and it is necessary to quote the best B.S.I. commercial specification when ordering supplies. The packer soon becomes skilled in the application of cordage; a twine or cord has 'S' twist,

so that when it is held in a vertical position, the spirals conform to the slope of the central portion of the letter 'S'. Another form is the 'Z' twist and here the spirals slope in this form. There are open hand knots, the well-known reef knot, the weaver or single sheet bend, the clove hitch, the sling knot which is tied back on itself and the follow-through knot. All of these have some application in bale packing kraft wrapped merchandise and specimen shapes of these knots may be obtained by the B.S.I. Various patent seals of metal are applied to cordage, twine, and wire to contain ends and thus make firm secure closure. Hand appliances are available for the purpose of seal closure which assist in the make up of a pilferproof package.

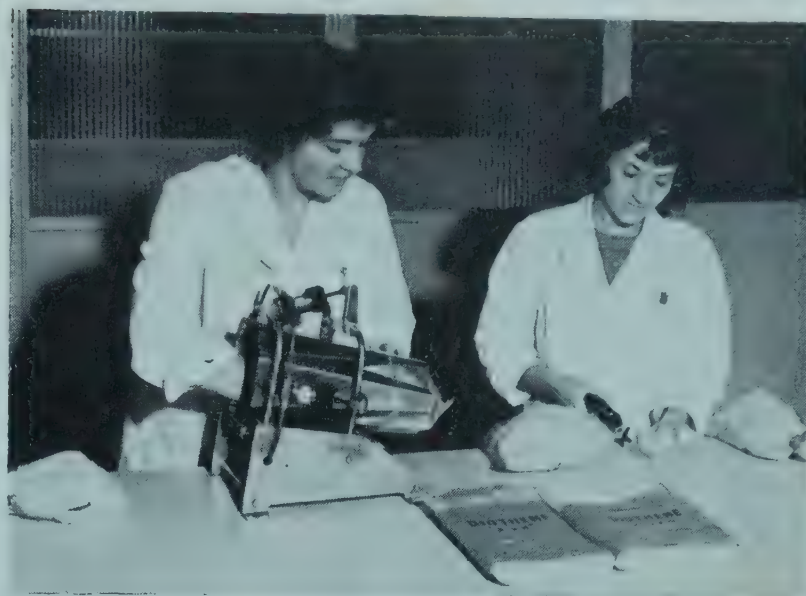
These materials are used for bulk merchandise sealing, closure and packing, but decorative tying tapes, coloured strings, raffia and similar material are used by the packager for handles, sealing materials for unit packages and the tying of fancy caskets, cases, boxes and for the handles of satchels and wallets.

Fancy Tags and Seals for Unit Containers

For the purpose of novelty and seasonal packaging operations, fancy and seasonal greetings tags and seals are available and, in addition, special designs and styles may be made to specification, becoming the sole design of the individual packager. Some examples of the gift tie-on tag are shown and similar designs are repeated in gummed labels which may be affixed to the package. Food producers and packagers with a product with a gift appeal may well consider this form of package presentation where the gift aspect of the product may be taken into account. Babyfoods, invalid foods, fancy food products, wines, spirits and liqueurs, glazed fruits, biscuits, cakes and gateaux are a few examples of products which are daily purchased for the purpose of presentation to a friend for some special occasion or purpose. The addition of a simple gift seal or tag adds appeal to the package and where an address label is included,



A few examples of punched-out decorative gift tie-on tags which may be used in conjunction with seasonal, gift and special occasions packaging. The motifs have a message relative to the occasion and their use makes the packages look twice as enticing. Seasonal and gift gummed labels are also available to the packagers of suitable products.



Metal Box Raptite poultry bagging machine.

as is the case with some Scotch shortbread packs, the package may be posted off after purchase. These little ideas have their roots in the U.S.A., Scandinavia and several continental countries where the appeal of the special gift pack has become firmly established.

Decorative Tyings for Gift Packages

Packagers concerned with the presentation of fancy foods in high class caskets and earthenware jars, and those concerned with the presentation of liquids and novelty bottled products of various kinds, will find that the package dressed up with ribbons and bows has an irresistible appeal to the buying public at seasonal times of the year or on occasions where the gift is being purchased.

The present day packager is considerably aided by the advent of bow tying machines which are capable of producing most exquisite types of bows, giving a look of elegance and luxury to the presentation of the product.

Ribbons made from various materials in all colours, widths and styles are now on the market and plain, satin and taffeta ribbons can be used in matching or contrasting colours in a delightfully effective way.

With the advent of mass production and the prime importance of cost, much of the ribbon now in use is of the so-called 'heat-sealed' or 'fused-edge' type which certainly scores on the question of price and ready availability, if required in substantial quantities. On the other hand, its lack of distinct selvedge does detract from its appearance and finish, much as a great deal of the effect of a picture is lost without a frame and, unless large quantities are needed, it cannot always be supplied in matching shades and the user sometimes has to make do with whatever colours may be available in a stock range. From these points of view ribbon with individually woven selvedges is frequently preferred.

Light and lacy ribbons, such as organdie ribbon or ribbon with a crepe finish, are also very popular and give a feeling of lightness and daintiness to a pack. Some are supplied in graduated ombre (shaded) colours. One new organdie

ribbon woven partly with a new plastic fibre is uncrushable and particularly suitable for the making of rosettes.

A pleasing decorative ribbon is that with a motif, trade mark or name actually woven into the ribbon itself but this is strictly a luxury item. Much more inexpensive and still very attractive is ribbon printed in a similar way. The potentialities of printed ribbon are still under-estimated, for one's own design, trade mark or name can be reproduced; alternatively a wide stock range of patterns is frequently available. One leading manufacturer this year, for instance, presents its coffrets with a printed polka-dot ribbon which blends admirably with the basic two-tone colour scheme. Inexpensive satin ribbon, giving an effect of richness, is also available with metallic gold, silver and coloured striping.

Perhaps mention should be made here of the laminated type of ribbon so popular in the United States of which 'Silsheen' is a well-known example in this country. This type of ribbon, having no weft to break the surface, has a particularly lustrous sheen and is ideal for decorative bands and a full rosette or pom-pom type of bow. It is, however, not so suitable for the flatter types of bow, being somewhat stiff and slippery in nature.

Apart from the style of ribbon, the quantity and arrangement are also most important factors. These can vary from the vast bouffant creations on expensive flagons to the neat, inexpensive bows used to give an added touch of glamour to an inexpensive production for the mass market. From the decorative point of view large arrangements such as rosettes, pom-poms and multi-loops are most effective, and so far as bows are concerned some sort of flat bow (which again can be produced in a wide range of forms) is almost universally used.

Automatic tying of these materials is not employed to any great extent. Most efficient machines, of course, exist for the actual tying of packages by means of cords, strings and attaching of loops to articles of various shapes and sizes. As yet, however, there has been no development of a machine for the tying of flat decorative bows and for cheapness and regularity this type of bow is still formed by hand. Bow-making machines have been used in the United States for some while and will be shortly available in this country but these are hardly suitable for industrial fancy packaging as they are specifically designed for the pom-pom and other fancy types of bows normally associated with gift-tying and are therefore essentially for use in such places as the gift-wrapping counters of large stores and have a rather limited application in the industrial field.

The Header Bag Label Closure

Various references are made to the header label which may be printed on thermoplastic or heatfix paper, gummed paper or on plain paper and wire stitched on to the opening of the filled filmic bag. The header label has a future in packaging products which are put up in film bags. The double faced and printed label, when folded over, makes both a seal and a closure to the open end of the bag. The printed matter carries the brand and name of the product and the header is invariably punched with a hole so that it may be suspended on a wire frame for display purposes and

for ease of demonstration at the point of sale. The product so packaged is fully visible and protected in its filmic bag. Such methods are ideal for small items, granulated products, nuts, confectionery, spices, powders and similar food products. Header labels are applied to open ends of bags by means of heatsealer jaws and examples of this form of bag closure are illustrated.

Sealing and Closure Materials Progress

A new Quikstrap banding tape which is a very flexible strapping material is worthy of special mention. Used in securing fibreboard corrugated packing cases and cartons, this banding tape is marketed by P. P. Payne of Nottingham. Methods of tape applications are illustrated, together with varieties of Quikstrap and an example of the ease with which this material is cut in order to open up packing cases so enclosed.

This new form of strapping material is made from virgin wood fibre twisted into yarns and bonded together to produce a strong, flexible, flat strapping. This material has a high tensile strength and can be supplied in varying widths.

The strapping can be applied under considerable tension with a simple, easily operated strapping tool, and the joining of the strapping is done by means of a seal of special design. It is claimed that seal strengths of between 75 and 80 per cent have been achieved.

Some advantages claimed for the new strapping are that it is very flexible and conforms closely to packages of different shapes thereby providing better closure and security. It is weatherproof, and does not rust or stain. It can be handled without danger of injury to workers and will not damage other packages encountered in transit. A knife or a pair of scissors is all that is required to cut the strapping and it is easily disposed of.

An ingenious floor stand dispenser has been designed to hold the strapping, which is supplied in traverse wound coils of up to 3,000 ft. The centre of the dispenser also acts as a receptacle to hold the seals.

The strapping is finished in natural colour and can also be supplied clearly printed in a variety of different colours and types at very little extra cost.

There are many uses for the new strapping material, particularly in applications where usual closing and securing methods are not satisfactory, and food and beverage packagers concerned with packaging problems will welcome this new addition to the range of reinforcing materials.

Chapter 10 discusses tape application, moistening by hand and machine methods but here it may be stated that gummed tape may be printed in several colours in any chosen design and style depicting the packager's products, the brand name and trading slogan of the manufacturer. Special 'Caution' printed tapes are available from stock.

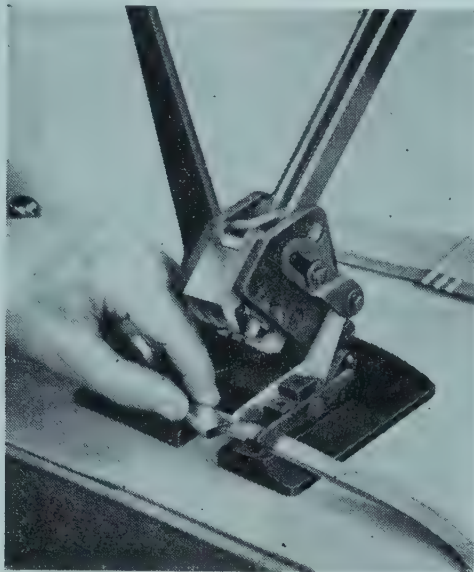
Gummed or glued tapes are made in brown and many colours, in strong kraft which conforms, in the case of the best branded grades, to the specification laid down by Trade Associations and the British Standards Institution. Glued tapes have a breaking strength which has an application to the bulk and weight of the packed merchandise.

Quikstrap banding tape —

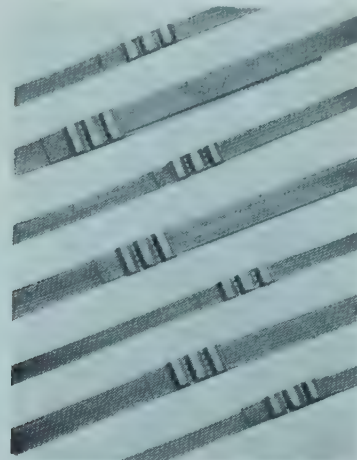
A new flexible strapping material



The operator withdraws tape from the dispenser.



Affixing the seal to the tape after tensioning has been applied. Top right shows the two widths of tape now in production.



Above is illustrated the ease of opening.

Tapes are made in many widths from $\frac{1}{2}$ in to 12 in. and wider if specified. The use of a colour helps to code a consignment and assists in the ready identification of a batch while in store.

Whatever the materials used in sealing, enclosing or packing unit or bulk merchandise, it is important that the best materials are used for the job. Packing has now become part of the process of manufacture and it is most important that the goods arrive at their destination in safe and factory fresh condition. Those who buy packing materials may seek advice on the best applications and it is equally important that those who use the materials and equipment should understand their method of use, their limitation where such exists and that all materials are used to the best advantage.

Labels as Units or on Reels for Overprinting

Many food packagers, distributors and large retailers have printing machine facilities to print their own labels on the lines of the Tickopress system. Blanks may be obtained for overprinting, the adhesive recipes including gummed dextrine, self-adhesive and heatfix coatings for adhesion to various surfaces and materials. By using printing equipment of this kind, first class labels may be obtained for the purpose of branding, pricing, coding or adding weight



The value of printed gummed tape for sealing and securing bales, packets, parcels, cases, cartons, containers and packing cases has no need to be emphasized as the advantages of printed kraft glued tapes are recognized the world over by the packer and packager for the speed and efficiency with which they will work.

details to fresh foods, joints of meat, bacon, poultry and other food products. Labels may be in colour, in units or preferably perforated in the reel so that they may be torn off as and when required. A simple hot iron or hot plate may be used to apply the heatfix label to the film wrapped or other type of package, a water moistener being required to activate gummed labels. Self-adhesive labels will be best for waxed cartons, while gummed label paper has an application in labelling deep frozen foods.

Printing presses of this kind are soon mastered by the packager or his assistants who become accustomed to labelling all kinds of food and allied products with various types of adhesive labels. Equipment may be found installed in both wholesale and retail sections of the trade where up-to-the-moment labelling may be required to mark a batch, a price change or some necessary detail.

Various types of overprinting machines are available which considerably assist the packager and stand him in good stead in some kind of emergency. Date coding, pricing and weight additions to packages are all important functions in selling foodstuffs and much of this work is carried out with heatfix, self-adhesive and similar types of labels printed on machines of the type outlined. Many machines perform the dual role of contents label and price ticket combined, enabling the purchaser or potential customer to obtain at a glance all the necessary information. In some cases, good designing is produced, in others, only the name of the supplier or his brand name, or the distributor's name together with a trading slogan. Preprinted detail covers such wording as 'Vacuum Packed for Sealed-in Freshness' and general instructions for the user such as 'On arrival home, please loosen the wrapping.' Other labels obtained or printed as required, in blank form, provide room for insertion of the net weight and price of the food package. Weights and prices are marked either in ink in prepacking departments or are entered being neatly printed by some form of printing press such as the Tickopress machine. With cheese tickets, it is usual for the overprinting machine to add at the same time, the name of the



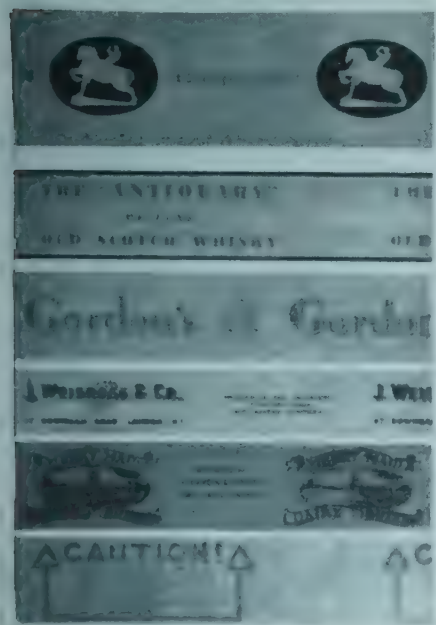
The Bland heat sealer device used in conjunction with heatfix thermoplastic header labels for use in the packaging of fine granulated products in filmic bags. The header bag labels is a form of closure and advertising medium for the product.

cheese. A whole range of plain and printed price tickets are available for this form of labelling so that the current situation does not interrupt the smooth running of product presentation in all its forms up to the point of sale. The printer himself has found in the past that this form of label work is most uneconomical. It is said that a newly organized production line, however, enables the Tickopress to accept orders involving up to ten changes of detail in each reel of only 1,000 labels. Such a process helps under current conditions although it was primarily introduced to eliminate the scrawled detail that often still disfigures many wrapped food products. The whole pack in many cases has been spoiled by hand written information although it may bear a first class seal or label applied by the manufacturer or his packager. The new high gloss coated label which looks so white and pure has a special appeal in this form of labelling and will, no doubt, be very considerably used in the near future for foodstuff labelling by this and other printed and embossing machine processes. Labels may be printed in colour thus conforming to the manufacturer's, packager's or distributor's colour scheme.

Pilferage of Food and Beverages in Transit and Store

Unit products of this kind lend themselves to pilferage and when they are not adequately packaged and packed in efficiently sealed packing cases or packages, the attention of the would be pilferer is invited. Pilferage is a world wide problem and losses abroad are even greater than those at home. The large volume of claims presented to carriers, the railway and shipping companies will give some indication of the very considerable percentage of goods that either arrive at their destination damaged or fail to arrive at all.

Much may be done by the packager to reduce this serious inroad into goodwill and loss of time, money and labour. It is not often a question of what may be done by the responsible authorities to protect consignments of goods, but what may be done by the packager himself to safeguard his goods.



Beverage packagers have long realized the value of printed paper based sealing tapes which are ideal both to secure the flaps of the fibreboard corrugated packing case and advertising the goods while in transit and store. Printed designs may be simple or ornate incorporating trade and brand names, messages and caution relative to opening up cases.

One way to defeat the pilferer is to make sure that all consignments are well packed in suitable sized containers without rattle or case over-filling. Obviously, it is always safer to keep goods moving as when goods are stationary, the time is ripe for on the spot examination by the pilferer. There is both casual and professional stealing, the former is generally the result of sudden temptation but regular and deliberate stealing is unfortunately increasing and constitutes a very real menace. Losses in these categories constitute a far greater drain than more spectacular incidents which receive wide publicity in the press. Packagers who are responsible for this aspect of trading should endeavour to ascertain into which category losses connected with their own particular trade fall before deciding upon the steps to prevent them.

Packaging, Packing and Securing

Materials such as kraft wrappings, fibreboard corrugated containers and packing cases have reached a high peak of perfection and strength in their make-up and do their job well. The material chosen however must be suitable for the product so that they afford ample protection for the merchandise. The packer must never 'make do' with odd materials found under the bench in the packing room. Here are some sound hints which soon become second nature to the conscientious packer:

1. The internal and external packaging materials used must be sufficiently strong to stand up to the job required of them.
2. Where wooden cases are used, the wood should be sound and any loose timber replaced, the cases being well nailed. Wire or tensile steel banding should be used for valuable consignments of foods and beverages. Loose boards expose packed contents in cases and badly placed nails are dangerous to the carriers.
3. Cartons and fibreboard packing cases are made to hold

A new strapping tape named Superseal. It is made from high tenacity rayon threads bonded together to form a weftless tape and backed with a high tack heavy duty latex adhesive. Current tests claim to show the tensile strength to be in excess of 320 lb. per inch width. It is supple and may be applied so that it conforms closely to the contours of the case or package to which it is applied as a seal or closure. It has no tendency to curl back. Short pre-determined lengths may be cut and used so that they give maximum reinforcement at the point of case stress or weakness. It may be obtained plain or printed in one or two colours to special designs. Simple hand devices assist in the application of this type which undoubtedly will take its place however limited alongside other tapes in the packaging industry.

specified quantities and they should not be over- or under-filled. The flaps of the container or case should be well sealed with first class liquid adhesive, glued kraft tape or B.S.I. strength or wire stitches. (See Chapter 10 for full details of case and container sealing methods and materials.)

4. Where re-used cases or containers are employed, they should be thoroughly examined for damage and repaired where necessary. Old markings and labels should be removed. Beware of the case with soft seams as it is liable to burst without any warning. Any temptation to cut costs should be avoided and inferior or second hand materials should be shunned. It is a 'penny wise pound foolish' policy.

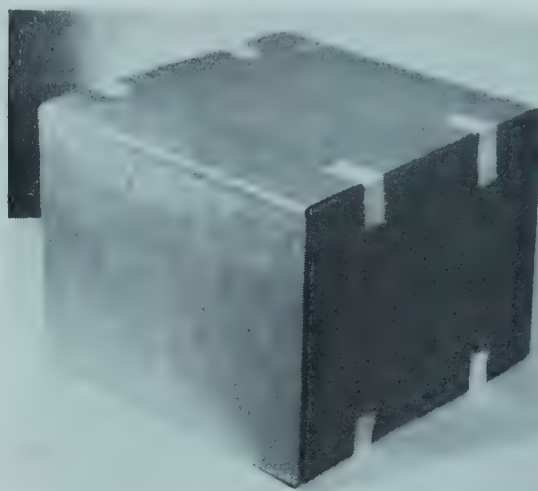
5. Strong grades of branded glued kraft tapes are recommended for bales of merchandise packed in kraft wrapping and only the best kraft should be used for the work. Canvas bales should be stitched with coloured string.

6. Lids of hampers should be tied with wire and sealed with the packager's or sender's seal and where possible, completely steel banded.

7. The use of cases and containers branded with the name of other products is very misleading to carriers and retailers alike and may be responsible for the misdirection of consignments.

Labelling the Goods

The importance of efficient labelling cannot be over-emphasized and the correct labelling medium and its adhesive should be carefully chosen. A large label with plenty of white space for name and address of consignee with printed details of the consignor is most important. Carriers report from time to time that many packages are sent bearing labels to two or more addresses, the previous



A portable tacky tape dispenser.

labels on re-used cases not having been removed. Here are some further hints relative to the labelling of consignments:

1. Wooden cases should be stencilled, the characters being as large as possible for visibility and ease of recognition. It is not possible for the pilferer to stick other labels over large type characters of this kind.

2. The labels used for kraft wrapped packages should be durable and the medium to large package should carry at least two labels preferably on either side of the surfaces.

3. Use the right adhesive label for the surface whether it be liquid or a coated label. Labels should be well-moistened, not too much or too little moisture; labels are best moistened by a hand labeller device. The adequate distribution of moisture to gummed label surfaces is most important. Labels should be allowed to dry before the goods are despatched.

4. Gummed paper labels or plain cards should not be tacked on packing cases as they are almost bound to come adrift in wet weather.

5. Name and address should be written or typed on the printed labels in bold block letters and it should be remembered that many packages are consigned during conditions of darkness and have to be read in artificial lighting. Tie-on labels of pastel shades facilitate the reading of addresses in poor light.

6. The number of packages comprising the consignment should be indicated on the labels together with the postal district and number of large cities. Where the destination bears the same name as that of another town, the county should be clearly shown.

7. Lists of contents should not be shown on labels as this only assists the pilferer, but there should be placed in all consignments a packing note showing the following:

- (a) Sender's and consignee's name and address in full detail.
- (b) Contents of actual packages.
- (c) Date upon which the goods were actually packaged and packed.

A duplicate of this information should be sent off by post to the consignees as advanced information.

Packages for export must be securely sealed, due regard being paid to the distance the goods will have to travel, local conditions of handling and storage. An investigation will often throw into relief the urgent need for bi-lingual labels to be used, first quality wrappings and stout fibre-board packing cases, wooden cases being used where necessary for heavy loads. Good documentation is essential. Experience has shown that many commodities are received for shipment in fragile cartons and containers and in such cases additional security would be afforded by means of cross banding with wire or tensional steel strapping. Instances have been reported to those investigating claims of loss and damage to consignments of foodstuffs and beverages that the following items feature high among the goods received for shipment in fragile cartons: biscuits, Golden Syrup, jams, fish pastes, sauces, pickles, etc., confectionery, lime juice, canned milk, and beverages.

Some goods are reported to be sent packed in straw in open crates and in such instances, small articles can be

extracted without very much difficulty. Wire mesh should be used to seal and secure crates and wicker baskets.

It has also been suggested that while cases are made to specification large size wooden or other cases are less liable to pilferage as they are not so easy to handle as smaller packages which may be easily picked up and stowed away pending an opportunity to open and pilfer. The packing of cases of spirits and liqueurs, for example, in sets of four with steel bonding, has been found to reduce the risk of loss or pilferage. The larger the bulk containers are made where valuable contents are packed, the less likely the risk of loss. It must be remembered, however, that correct documentation with full details of consignment on the appropriate notes is better than advertising unit details of contents on packages by label or other means.

To summarize, packing and packing materials must be strong enough to do its job and here the British Standard Packaging Code may be followed with every advantage. First class labelling with clarity of address and legible consignment notes are of the utmost importance. Efficient strapping material should be used to enclose the contents of a container. Packaging materials have reached a peak of perfection, but it is the knowledge of their application that is often wanting. The research facilities of the manufacturers of most types of packaging material are at the disposal of the food and beverage manufacturer and the packer.

While the package closure materials seems a relatively small item of cost in relation to the product, they play a major part in ensuring that a consignment of goods reaches its destination safely. Good packaging and packing is part of the process of manufacture and the final step in the chain of successful trading.

Finally, a packing case which is unsealed should never be pulled along by its flaps as such treatment may cause damage to the case; similarly, a case which is not perfectly sealed is insecure and cannot be expected to carry its contents efficiently to its journey's end. Efficient preparing, packing and sealing of all kinds of packing cases used should be routine jobs in the factory, but they must be carried out properly.

Bulk Packing with Steel Strapping

In recent years there has been a tendency for continental packers to bulk pack suitable products merely with the aid of suitable wire or steel strapping, thus obviating the use of wrapping outer containers or packing cases.

It is claimed that it has many advantages, as merchandise packed in this way takes up less space in store and results in lighter loads in transit.

At the same time, the checking of stocks is much simpler and pilferage is reduced to a minimum as missing contents from bales are at once observed. This process may be termed cartonless packing. Cartonless packing comes at a time when the British manufacturer of wire and steel strapping is in a strong position relative to quality and supplies as considerable quantities are being exported overseas together with the necessary equipment for wire application.

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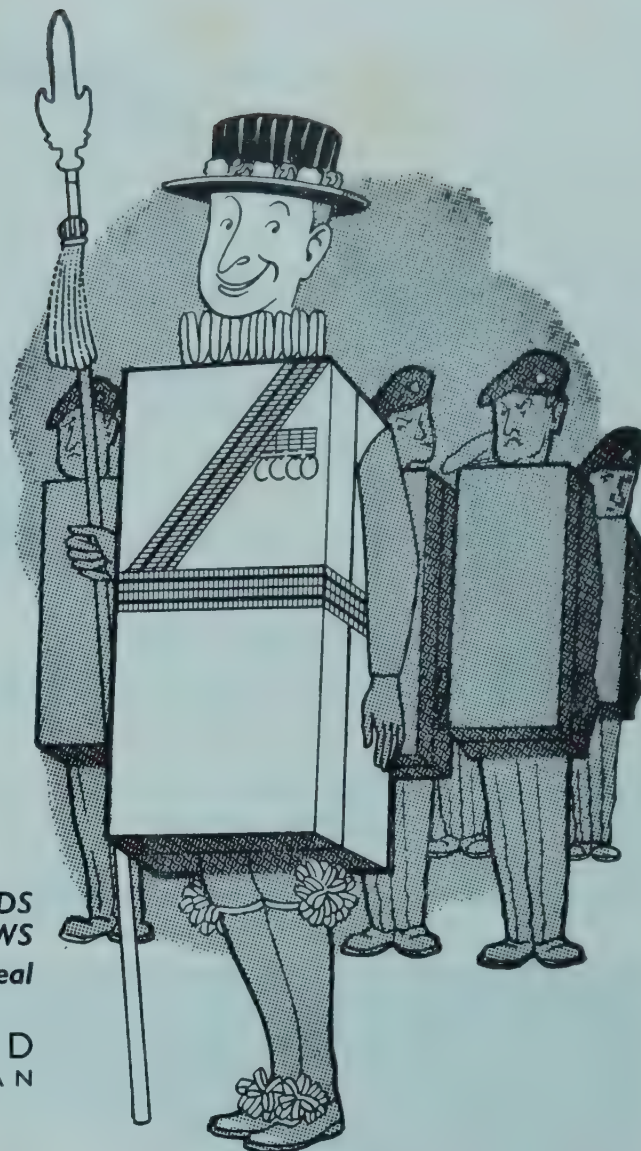
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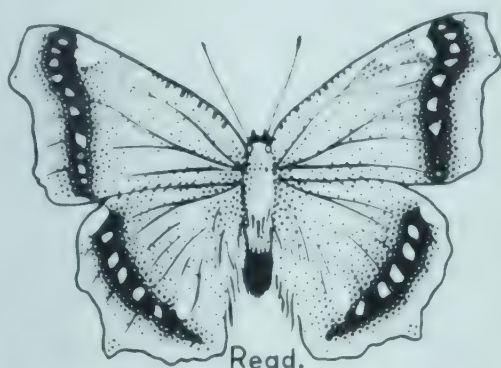
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CHAPTER 10

Hand and Automatic Sealing and Labelling Devices

THIS chapter is not concerned with the methods and materials used by the packing case maker for securing the joins and seams of various types of fibreboard and other paper based packing cases. This operation is part of the process of carton, container and packing case manufacture and suitable equipment is usually incorporated with packing case making machine for this purpose. It is proposed to survey the various methods of packing case, bale and carton sealing, labelling and closure, after the collapsed case has been filled or the products have been wrapped in suitable kraft wrapping with food or beverage units. In the main, there are flaps to be sealed or secured firmly in position or, as in the case of wrapped merchandise, seams and flaps ends of packets and bales to be sealed.

How to Seal a Fibreboard Corrugated Packing Case

The fibreboard packing case, carton or merchandise display unit and container are popular methods for the packing of food and beverages. Most types of fibreboard 'one-piece' type cases or cartons are delivered to the packer flat or collapsed. The method of assembly is simple: the case is first opened out so that the flaps which form the bottom of the case may be dealt with first. The flaps are made with a reverse crease and this must be started by first bending the flaps inwards, then outwards, a simple process after a minute study of the packing case. Assembly instructions are sometimes printed on cases but it will soon be found that cases form their shape very quickly. The preparation of the case prior to filling involves the securing of the bottom flaps by various methods, i.e. with either liquid adhesive, wire strapping, gummed sealing tape, cellulose self-adhesive tape or wire stitches. These various processes all have their advantages and disadvantages. Having dealt with the bottom flaps and folded them inwards again, the packer turns the case over and deals with the top flaps in the same way leaving them open so as to fold back out of the packer's way, thus facilitating filling. Packing cases must be completely filled leaving no spaces or gaps which may cause a rattle which can result in breakage or spoilage of glass or labelled units. If this important aspect of case filling is initially determined by the packer and suitable dimensions of the case are planned, both packing and the safety of the contents will be ensured. Where goods are packaged in paper bags, packets or cartons the packer should commence by placing the corners where the stitched flange is situated. Any gaps in filling may be

adjusted by suitable protective wads, pads, cushioning material, shavings or wood wool.

Railway Requirements

Where consignments are sent at Railway Risk, there are certain requirements to be met.

Not exceeding 30 lb.—Case flaps need to be glued only on 50 per cent of the area or sealed with gummed or self-adhesive tape only. The tape must be applied along the whole length of each flap (six pieces) to secure the flaps to each other and to the body of the case itself.

Over 30 lb. Contents.—Case flaps must be securely glued and taped over the joints. If the inner flaps meet, or a filler piece is used, the tape may be omitted. Where cases carrying weights of over 60 lb. are involved, all flaps must be securely glued or sealed with gummed kraft tape over joins.

Packing Case Sealing

When the filled packing case or carton is ready for sealing, the material for closure is next applied. The safest method which the vast body of experienced shippers and packers use is the gummed kraft glued tape case sealing process where the moistened tape may be applied by hand or automatic methods to seams and flaps of packing cases of all kinds made from paper based materials. Tapes made to B.S.I. standards for strength stand up to stresses and strains often encountered in the despatch of packed merchandise. Some recent recommendations revising the packaging code B.S.1133 Section 14 are included in this survey of case sealing with gummed tape.

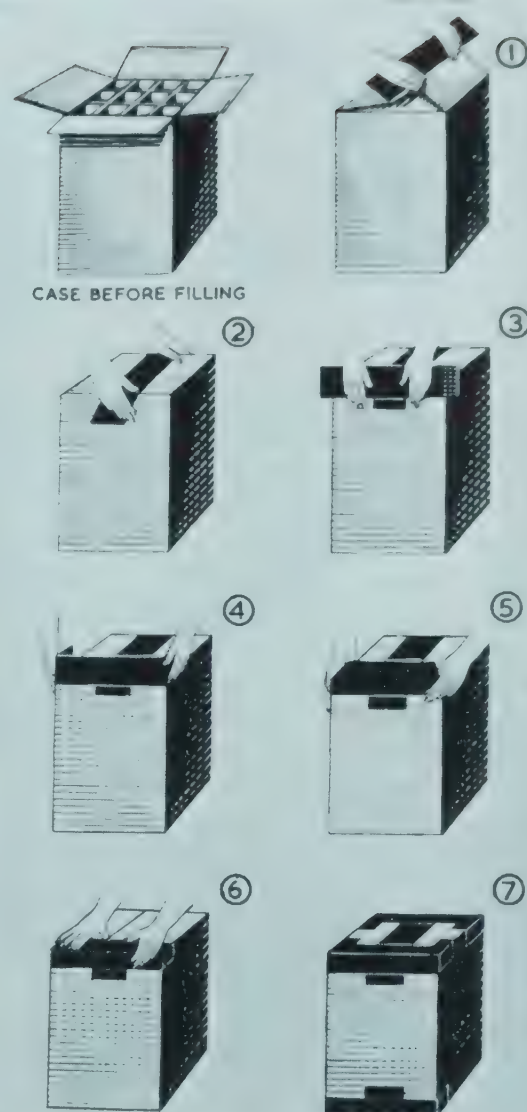
Sealing Tape

The application of sealing tape is simple, speedy and yet most effective. Sufficient tape must be used to make a firm seal as too little will not make a perfect closure. Perfect tape moistening is important as has already been stressed in this book; not too much moisture or too little. Water is best applied by some suitable hand or automatic brush moistening device. The general appearance of the filled and sealed case must be considered and too much overlaps of tape may spoil the appearance of the case. This is important where cases of merchandise units are used for display and selling. Moistened tape should be carefully smoothed down to case surface by hand rubbing, the joints having special attention. Printed 'caution' glued tapes are an added deter-

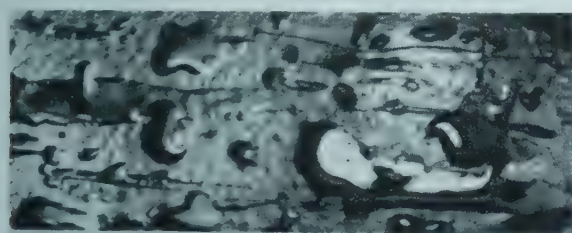
rent to pilferage. Consignees are asked not to give a clear signature for a delivery if tapes are broken. Glued tapes used for case sealing must not be less than 2 in. wide. The moistened glued tape is applied where the case flaps join and an allowance of some $1\frac{1}{2}$ in. overlap at each end provides added sealing strength. The first strip of tape is applied over the main two flaps when brought together. The second piece of tape seals one edge of the flaps. Corner mitring is neat and gives strength to the packed case.

Packers may have their tape printed in one or more colours embodying trade mark, trading slogan or brand name of product and, as mentioned, packing cases may be additionally or solely sealed with either a plain or standard 'caution' printed tape. A standard series of brown shades or strong colours may be used for the purpose of ready identification of a case or a consignment of packed merchandise. The use of attractively printed and coloured tapes is a credit to the manufacturer and the packer; they help to build up goodwill and encourage extended business. Preparing, packing or filling and case sealing soon become routine jobs in any factory but they are nevertheless worth doing well. Efficient tape application takes no longer to carry out but it will greatly assist in the reduction of losses and damage to packed cases in store and in transit.

Glued kraft tapes are generally considered to be easier, thicker, neater, safer and less expensive than other closure methods. Add to this the facility of printing, there is much to be said for this method of case sealing. Glued tapes also have an application in sealing parcels, containers, bales and packets of all kinds made up from kraft wrapping and similar material. While these tapes are often referred to as gummed tapes, animal glue is used for the adhesive coating



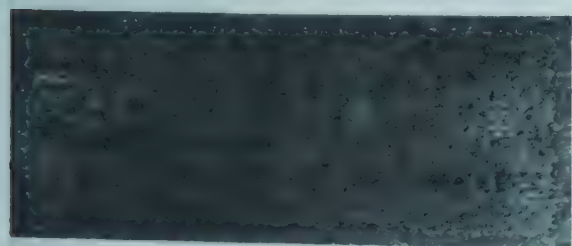
The process of tape application in seven stages.



TOO MUCH MOISTURE



INSUFFICIENT MOISTURE



CORRECT MOISTENING

Correct moisture application to glued tapes.

which is applied to strong based kraft material. Most branded grades of glued tapes are flexible and lend themselves to edging and cornering work in packing.

A strong, thick, heavily adhesive coated grade of tape is not required for all forms of packing and where small to medium sized packages or cartons are concerned, thinner tapes may be used. However, the kraft base paper should be made to specified standards of strength based on Mullen tests of pounds per square inch such as comply with specifications laid down by the B.S.I., rail and shipping companies, and trade associations. Sample coils may be obtained and tested and where new cases or materials are being packed, this is often advisable.

Here are some recent Packaging Code revisions of B.S.1133 relative to the use and application of gummed tape.

Adhesive Closing and Sealing Tapes

General.—Gummed tape is used for sealing corrugated and solid fibreboard cases, rigid paper boxes, paper cartons (see Section 7 of B.S.1133, 'Packaging Code'), small packages, large heavy bales, and indeed almost all kinds of packages. Reinforced tapes, and gummed cloth tapes are available for use where particular strength is required. When the tape is made from hard-sized kraft (as described in Section 7 of

B.S.1133, 'Packaging Code'), gummed paper tape has damp moisture and water resisting qualities sufficient for general hazards of transport.

Materials.—The base paper shall consist of pure kraft, hard-sized to resist adhesive penetration, and flexible to ensure folding and conformity with the shape of the package. The bursting strength of the gummed paper tape shall be in accordance with Table 1, when it is tested by the method described in Appendix A.

The adhesive shall contain not less than 75 per cent of animal glue of not less than 61 g/Bloom jelly strength when tested in the manner described in B.S.647, 'Methods of testing glues (bone, skin and fish glues)'.

Gummed paper tape is available in a wide range of widths and strengths of which the appropriate ones should be chosen according to the size and weight of the package to be sealed. Table 1 gives a rough guide to this selection and indicates also the weight of adhesive coating appropriate to the particular type of package and tape.

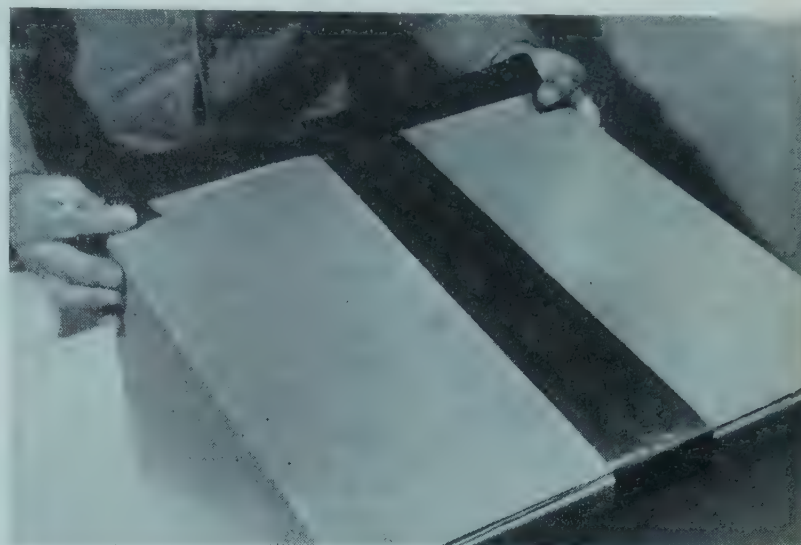
TABLE 1.
Typical Examples of Use of Gummed Paper Tape.

| Type of package | Minimum bursting strength of tape | | Minimum weight of adhesive | Minimum width of tape | | |
|---------------------------|-----------------------------------|--------------------|---|-----------------------|-----|-----|
| | lb./sq.in | kg/cm ² | lb. per 1,000 sheets Double Crown (20 × 30 in.) | g/sq.m. | in. | on. |
| Large heavy wrapped bales | 70 | 4.9 | 24 | 137 | 4 | 10 |
| Fibreboard cases | 50 | 3.5 | 24 | 137 | 2 | 5 |
| Paper boxes and cartons | 50 | 3.5 | 24 | 137 | 2 | 5 |
| Small Packages | 30 | 2.1 | 22 | 125 | 1 | 2.5 |

A simple method of making a practical test of the adhesive quality of gummed paper tape is to moisten a small piece and apply it to the package to be sealed, rubbing it well down. Allow ten to 15 seconds to elapse, then pull away the tape and if the adhesive is good, a noticeable amount of the fibre of the paper will come away with the adhesive. After two hours the tape shall remain so firmly affixed that it cannot be removed without tearing either the tape or the paper.

Application and Use.—An efficient moistening machine should be employed. The machine should be kept clean and the water in the tank maintained to the correct level. Application should follow immediately after moistening, the tape being well rubbed down with the hand.

Storage.—Gummed paper tape shall be kept in the original waterproof wrappers until required for use and shall be stored in a warm and dry place. Extremes of temperature shall be avoided. Contact with moisture or exposure to damp atmospheric conditions will cause deterioration of the adhesive. The tapes shall not be stored on concrete floors, which attract moisture.



Case seam sealing with glued tape, showing how to make a mitred corner.

Sealing and Handling of 30-dozen Size Fibreboard Egg Cases

In view of the considerable development in the use of fibreboard packing case for the purpose of egg packaging, the following recommendations formulated by the British Egg Marketing Board are published. In addition to the use of gummed tape, other methods are also outlined which include stapling, or wire stitches and the use of adhesive.

'The Board have continued their investigation into the methods for assembling and sealing 30-dozen size Fibreboard Egg Cases. There are several methods which may be employed with good results and the Board have therefore decided to allow Packers some choice as to the method they employ. The following are the alternative methods permitted to be used for assembly and sealing of 30-dozen Fibreboard Egg Cases into which eggs are packed in accordance with the Packers' Agency Standard Conditions. The Circular also contains guidance on assembly of Fibreboard Cases and packing and subsequent handling which may prove helpful to Packers.

This Circular which comes into operation on 4th May 1959 replaces and cancels Packers Circulars Nos. 3/58 and 7/58. It is to be read in conjunction with Packers Circular No. 9/59.

These instructions may be revised in the light of further investigation and experience. It is hoped that Packers will bring to the notice of the Board any improved methods of assembly of which they may become aware.

Part I—Bottom Sealing or Assembly.—Fold the long flaps over the short flaps so that the long flaps butt and do not overlap. Then employ one of the following methods for fastening the bottom. Where staples are used they must be of the description Method I or Method II below. Where gummed tape is used (Methods III & IV) it must be of the following specifications:

Pure Kraft tape of the width indicated in Methods III or IV; minimum bursting strength for Method III being 50 lb. per sq. inch and for Method IV being 75 lb. per

sq. inch; adhesive on the tape to contain not less than 75 per cent of animal glue of not less than 61g bloom jelly strength when tested in the manner described in B.S.647; weight of adhesive coating per 1,000 sheets of Double Crown (20 × 30 inches) not less than 24 lbs.

Method I—Stapling.

Use not less than 12 well clinched hard steel staples of the following minimum size:—

Length of leg— $\frac{3}{8}$ in.

Width of Crown— $\frac{1}{2}$ in.

Cross Section—0.025 × 0.050 in.

Method II—Stapling.

Use not less than 4 hard steel staples of the following minimum size:—

Length of leg— $\frac{1}{2}$ in.

Width of Crown— $1\frac{1}{4}$ in.

Cross Section—0.037 × 0.074 in.

Method III—Gummed Tape.

Minimum width of tape $2\frac{1}{2}$ inches. Stick one piece along the butting long flaps so that it adheres equally to each long flap and overlaps each end of the container by at least 2 inches. Stick two shorter pieces to seal the short flaps and overlap each side of the container by at least 2 inches.

Method IV—Gummed Tape.

Minimum width of tape 3 inches. Stick one piece along the butting long flaps so that it adheres equally to each long flap and overlaps each end of the container by at least 2 inches.

Method V—Glued Flaps.

Apply a suitable case sealing adhesive to the whole surface of the two inside short flaps. Apply weight to ensure that after application the surfaces of the fibreboard are held firmly together.

Part II—Top Sealing.—The following methods and materials only are permitted:—

- (i) Staples sealing as described in paragraph 2 (Method II) using four large staples.
- (ii) Kraft tape sealing as described in paragraph 2 (Method III).
- (iii) Kraft tape sealing as described in paragraph 2 (Method IV) but with a minimum bursting strength of not less than 50 lb. per sq. inch.
- (iv) Sealing with adhesives as described in paragraph 2 (Method V).

Self-adhesive Tapes for Sealing

In recent years, pressure-sensitive tapes or self-adhesive sealing tapes have been used for sealing containers of many kinds. They have an application in the closure of small to medium sized packages and containers. Made in several colours, they may be printed to special designs such as

trade marks or brand names. They are applied to surface without moisture, merely by finger pressure. Various branded tapes have been developed to serve the needs of the packaging industry in general. Vinyl tapes with exceptional waterproof and water-vapour qualities are recommended for food and allied container unit sealing purposes. Many self-adhesive tape makers offer a complete range of sealing machines which vary from hand-operated dispensers to automatic and semi-automatic machines. The series of Lassotaper machines and dispensers are among various appliances now in use for the purpose of tape application. The best grades of tape have exceptional tensile strength and mould well to irregular shapes and edges. Vinyl tapes provide an ideal sealing medium to use in the biscuit, confectionery and food trades. Polythene tape is another grade and this is soft, pliable and flexible with a low yield point and is extremely resistant to water and to most organic solvents. This tape remains flexible and adherent at very low temperatures which makes it highly suitable for sealing food packages for deep freeze processes. Its waterproof qualities make it ideal for sealing hygroscopic products.

A cloth tape, made from high grade cotton cloth spread on one side with pressure-sensitive adhesive, will be found to adhere firmly to metal, plastic, wood, cardboard and paper. Such tapes have great strength and will withstand rough handling, making it most suitable for reinforcing fibreboard and cardboard containers. The tape is a first class all-purpose packaging tape and is proof against oil, dust and moisture contact. Made in white and several colours, it has a tensile strength of not less than 30 lb. per square inch. Other cellulose tapes have a high tensile strength and are resistant to vegetable and mineral oils. Here again, such tapes mould well and are ideal for sealing cartons, bottles and tinplate containers.

Two well-known cellulose tape machines, the Butterfly and the Universal Lassotaper may be used on the production line for container sealing. Each and every sealing machine is made with a purpose and for the application of certain types of tapes and various widths. The Lassobander is an automatic machine for sealing cartons or skillets and has been specially made to apply a length of plain or printed self-adhesive tape to two skillets or cartons simultaneously. The maximum output of the machine is 32 packs per minute. The use of this machine is claimed to increase productivity, at the same time ensuring that the product so packed, reaches the ultimate consumer in factory fresh condition. A partner to this machine is the Universal Lassotaper, designed to seal most shapes of container. It is also claimed by the maker that an operator can seal up to 30 containers a minute. Jigs which can be changed in a matter of minutes may be fitted where several different shaped containers are handled.

Most dispensers in this field will cut off pre-determined lengths of tape by measurement and this ensures no tape wastage. Machines can be loaded and set ready for use very quickly. One or two inch width tapes will cover most forms of tape application.

Bale and Packet Sealing

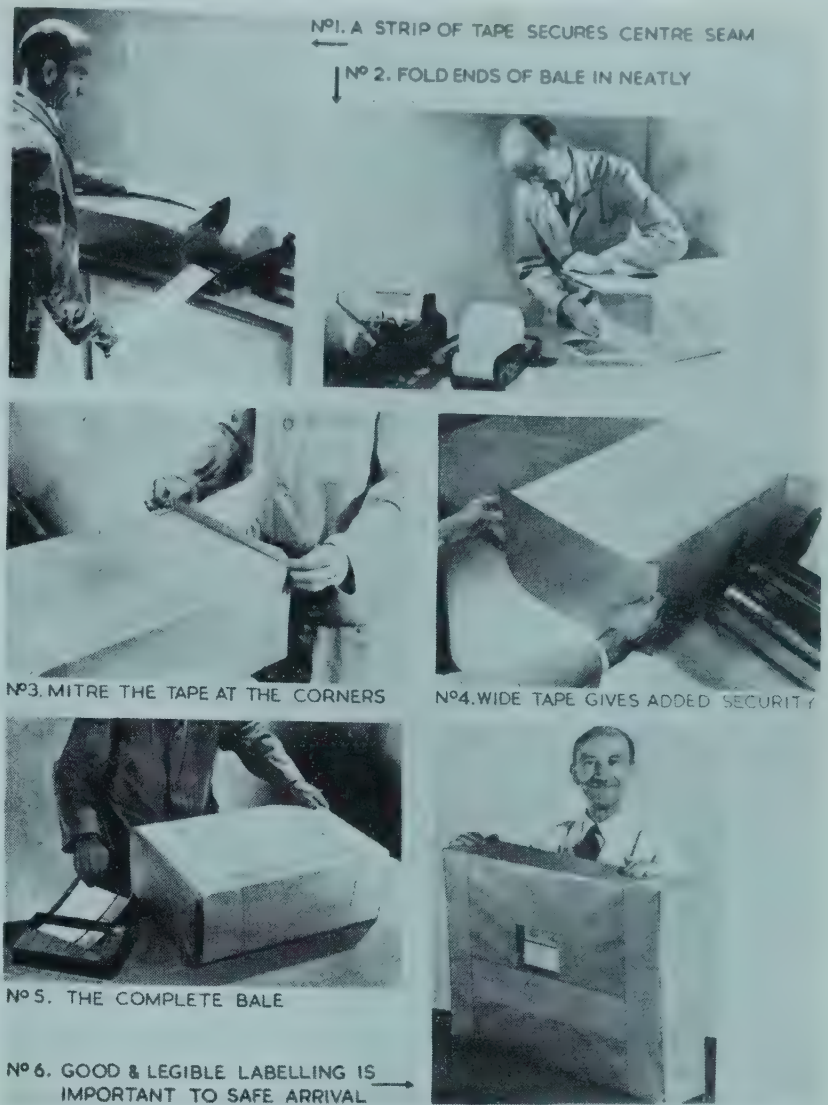
All kinds of bulk merchandise and other items packed in parcels, packets, medium to heavy bales and awkward shaped packages wrapped in kraft wrappings, are best sealed at the flaps, ends or seams with a suitable kraft glued or gummed tape. String or cordage is also used for such forms of packing but care must be taken to ensure that string is not pulled so tight that it cuts into the corners, sides or edges of the package thus causing the kraft to break open with ensuing damage to packed contents. Most bale and roll packers use gummed tape and some suitable sealing machine which moistens and cuts off tape to a pre-determined length ready for application.

Where kraft is used, some regard must be paid to strength and waterproof qualities, and reference should be made to the various hints given in Chapter 13. Sometimes, an inner protective wrapper of waxed paper, corrugated cushioning material, rough cheap brown wrapping may be used to advantage to form a greater resistance to moisture penetration or damage resulting from the careless handling of a wrapped consignment. Kraft wrapped bales are first secured by applying a suitable length of moistened gummed tape to the centre seam or kraft wrapping join; this is shown in No. 1 and No. 2 which shows the ends of the wrapper being neatly folded in to form an end to the bale. This is in turn, secured with tape, the corners of the tape being neatly mitred as shown in No. 3. A wider width of moistened glued or gummed tape is applied to each end of the bale giving added security and strength and it is often at this point, that the bale is dropped on end. The completed bale is seen with wrapper seams and both ends neatly secured with tape, the bale being appropriately labelled, the finished job made ready for loading on the conveyor or van for despatch.

A compression unit may be used to hold down springy flaps of cartons, containers or bales prior to the application of glued tape. A suspended weight is lowered to hold the flaps or bale ends firmly in position ready for tape application. Hand baling weights are also made for the purpose of

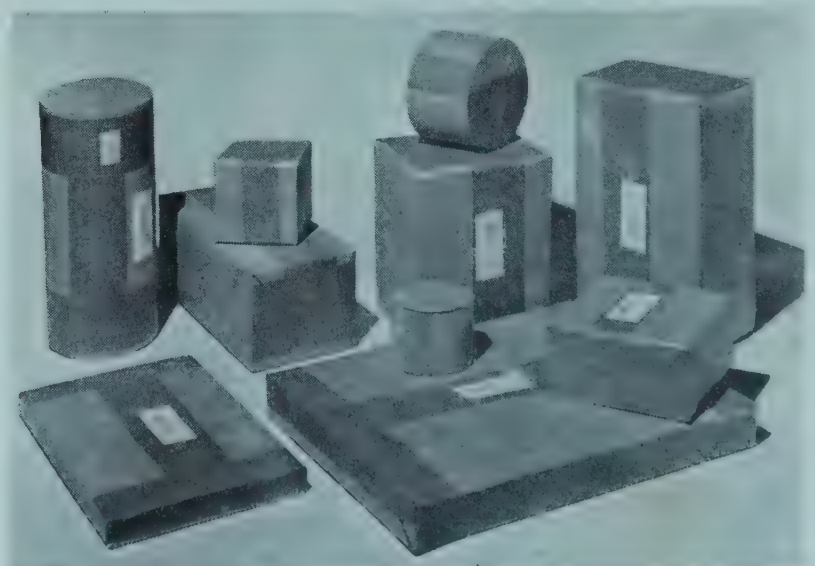


A compression baling or carton sealing weight to hold seams and flaps in position prior to tape application.



Bale sealing with glued kraft tape.

rounding corners and smoothing edges or folds of bales and packages prior to tape application. Rounded packages bring in the use of glued reel end circles. In roll package wrapping and sealing the glued kraft strip with a serrated edge considerably assists in strengthening the ends of round bales. The serrated sections of the edge protector are separately sealed down thus affording ample protection at the most vulnerable point of the package.



Packets and parcels sealed with glued tape.

Glued Kraft Circles

Most packers associate the form of glued tape with material in the coil and this is of course true. There are, however, punched out circles in all diameters, and squares and these may be used for end sealing of circular and square shaped bales. They may be printed and used as advertising mediums to publicise the product or the contents of the package. Anything from 2 in. to 30 in. diameter may be obtained for special bale packing and these have an application in the food trades for use where round merchandise is packed. Label dampers are available for the purpose of moistening glued circles and squares. While tapes are generally referred to as gummed tapes, there are stronger and heavy grades of tape known as balestrip sealing tapes. These heavy tapes are used for sealing bulk merchandise weighing up to and over one cwt. The accurate application of these tapes to heavy kraft wrapped bales assists in merchandise protection from breakage and prevents movement or spread of the wrapper or contents.

Hinge Cloths and Cambrics for Container Work

Fibreboard corrugated packing case, carton and container makers use very strong glued hinge cloths and cambrics for the purpose of sealing joints on cases. There are heavy-weight single ply kraft tapes and sisalkraft glued tapes. Recent developments in this field of tape usage are resin laminated glass fibre tapes which have considerable strength and in some cases are untearable. A taped joint on the initial corrugated fibreboard case provides the maximum degree of strength to the container. Hinge tapes are made up from reinforced kraits, laminated with bitumen and some contain sisal fibres. Cambrics are woven cloths of considerable flexibility and yet much rigidity and are ideal for case making. Laminated glass fibre tapes are made from two sheets of strong kraft laminated with synthetic resin combined with fibreglass strands for additional reinforcement.

Case Sealing with Adhesive

Chapter 3 reviews the grades and applications of adhesives. All kinds of cases, cartons and container flaps are sealed and secured with some suitable adhesive such as sodium silicate. The only disadvantage of the use of adhesive is that the flap of the case have to be torn away upon opening and this prevents the case from being used as a display piece, for re-use or return. Where comparatively few packing cases are being handled, fastening by means of adhesive may be carried out in the following simple way. The filled case is placed into position the inner flaps being folded down in the correct position. The adhesive is brushed liberally over the flaps, but not too near the edge; a little adhesive is also applied to the upper flaps if they overlap. The upper flaps thus treated must be folded down immediately. Next turn the case upside down carefully on the creases of the top flaps to avoid distortion. The weight of the contents will hold the flaps in position. The bottom of the case will be fastened in due course in the same way. In practice, it is more convenient to fasten the top of a number



How to seal roll packages.

of cases, inverting them immediately they are done, and then returning to the first and fastening the bottom of each case (now uppermost) in the same way. If the time has been given for the adhesive to set at the other end, the case may be inverted again. A large flat weight may be used to hold flaps in position. As mentioned, liquid mineral glue is the type of adhesive generally used for fibreboard case closure or sealing. It is quite distinct from ordinary glue and unless this is understood satisfactory results will not be achieved. Liquid mineral glue sets very strongly and very quickly. It is therefore absolutely essential to bring the glued faces of board together immediately the glue has been applied, and to keep them there, as they will not re-stick if allowed to come apart. Successful sealing is assured if the following points are observed.

1. Use a wide flat brush with stiff bristles.
2. Lay the glue on thickly and rapidly.
3. Bring the glued faces of flaps together immediately.
4. Keep them in close contact under pressure until the adhesive has gripped.
5. If the adhesive has begun to set before the flaps are folded down, or if they have come apart, put on a fresh layer of glue.

Packing cases need all round strength and this is obtained where adhesive is employed for case sealing based on a silicate adhesive. Sodium silicate is economical as well as being strong. A first class bond takes place at least 20 per cent greater, it is claimed, than other types of board making adhesives. This adhesive is said to provide great rigidity, better compression strengths and a substantial increase in flap crush. Adhesive manufacturers have technical service facilities with complete knowledge and experience of all forms of case and container sealing and they may be consulted with advantage.

Wire Strapping or Stitches

Trade associations recommend either of these two forms of case sealing in some instances, but they are an alternative to tape or adhesive case closure. Where a case has been treated with the tape or adhesive, no other additional closure treatment is necessary or desirable. Wire strapping

or wire stitches are a safeguard against pilferage particularly for export shipments and such methods are generally considered to be preferable to ordinary string or cording. Too much or too little material should not be used and recommendations relative to the number of stitches and their placing are laid down by various bodies and should be followed.

The method of case sealing adopted will have a bearing upon the quantity of cases filled and sealed. In the case of major packaging or packing operations, some suitable device is often incorporated with the filling machine or production line.

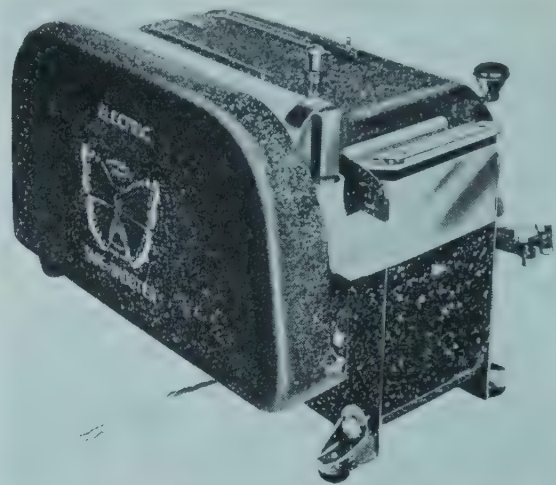
Compression Tests for Filled and Sealed Cases

The revolving drum filled with packages is one way to test a consignment or individual cases of packed goods. Such tests may be carried out by arrangement and P.A.T.R.A. have equipment specially designed to test package durability. For some years, tests have been carried out in the U.S.A. in connection with the top to bottom compression of a carton, the extent to which cartons closed with various materials simulate harsh treatment. Such tests simulate the stresses and strains to which packed cartons are subjected when stored in warehouses or enroute for delivery. In other tests, the various closure methods have been tested for ability to withstand the occasional end-to-end stacking to which cases and containers may be subjected. The revolving drum will determine the extent to which each of the closure methods could withstand the bounces and shake-up which cartons often have to undergo in handling during their transportation. Drop tests are also made and the ability of the carton closed with the various forms of closure material to withstand rough handling, is calculated by accidental falls and suitable measuring devices. In most instances, glued or gummed tapes have stood up to the severe tests made.

Sealing Machine for Glued Tape Application

A wide range of sealing machines which moisten, cut off and shoot out measured or pre-determined lengths of glued tape, in various widths, is available.

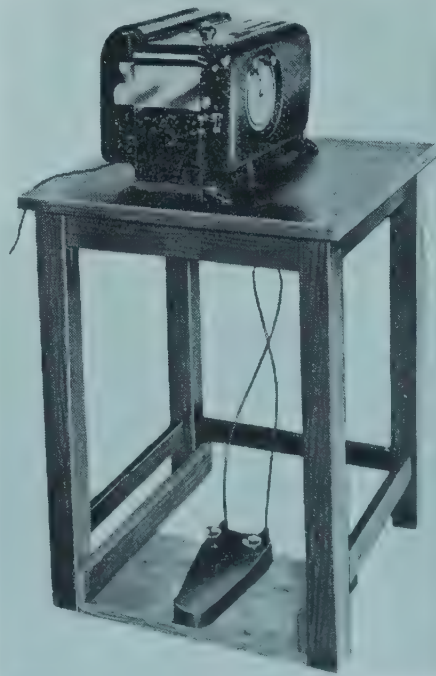
The latest electrically controlled tape shooting machine takes widths of glued tape up to 4 in. in width and dispenses two distinct lengths of tape ready moistened for application to packing case flaps or bale ends and seams. These machines may be set by gauge measurement to two separate lengths of tape which are often required in sealing rectangular shaped packages where short and longer lengths of sealing tape are required for sealing ends, flaps and seams of cases and bales. The machine incorporates auxiliary water supply in a container which is visible and may therefore be re-filled as required to avoid any hold up in tape moistening. Pre-set lengths of tape are dispensed by either finger pressure button or by foot pedal and in the latter case, both hands of the packer are left free to apply the moistened tape to the package. The water is scientifically controlled so that even spread of moisture is ensured. The cut off knife gives a quick clean piece of tape in the length as set on the machine. These machines may be used individually as a unit on a



The latest electrically controlled tape shooting machine.



The tape shooter is being operated by foot pedal control with both hands free for tape application and the measurement gauge may be seen at the side of the picture. Very speedy packaging and packing operations are possible with this machine which is claimed to be the latest, the most efficient tape moistener and dispenser available today.



The tape shooter complete with foot pedal in position. The tape is moistened with brush moistening device which ensures an even spread of moisture over the entire glued surface of the tape. Capillary action of the special brushes controls the flow of moisture.

packing bench or installed as part of a flow line production filling and packaging scheme. The tape is fully protected from dust by a cover and the machine is easily re-filled with fresh coils of tape as required. Either one full width coil may be used or two varying widths.

There are many types of self-adhesive tape dispensers and each have some special facility from the packaging point of view. New designs and further development in this field of tape application may be expected.

There are very wide sealing machines for use with Balestrip sealing tape which hold one or more rolls of glued tape up to 12 in. in width and these are used for heavy and large bale sealing work. Most of these machines have a roller moistening device which revolves in a tank of water. There are also non-automatic types of sealing machines where the tape is pulled off by the packer as required who has to gauge the length of tape but such machines can result in wastage. Too much or too little tape dispensed in the packing of merchandise can result in loss of time and wastage of material.

The automatic type of sealing machine is recommended for small, medium to large sealing case and bale projects.

A new type of portable self-adhesive tape shooter may be carried round the store or factory and used for the purpose of sealing packages and cartons on the spot. A backward movement of the appliance dispenses the necessary amount of tacky tape and pressure will apply the tape over flaps and ends of packets and cases. Where bulk supplies are opened up to extract part contents for an order, the remainder of the package may be quickly and efficiently re-sealed on the spot without the necessity of moving the package from store. They may be used on the packing bench where cartons or cases are moving on the flow line. They are speedy in use. Another use of this new portable



An alternative model of the tape shooter is the hand-operated type which also cuts off two measured lengths of moistened tape ready for application to the packing case or container. A pull of the lever dispenses the requisite amount of tape measured off on the gauge to seal and secure the flaps of the food container. Notice here that the tape is printed with the brand name.

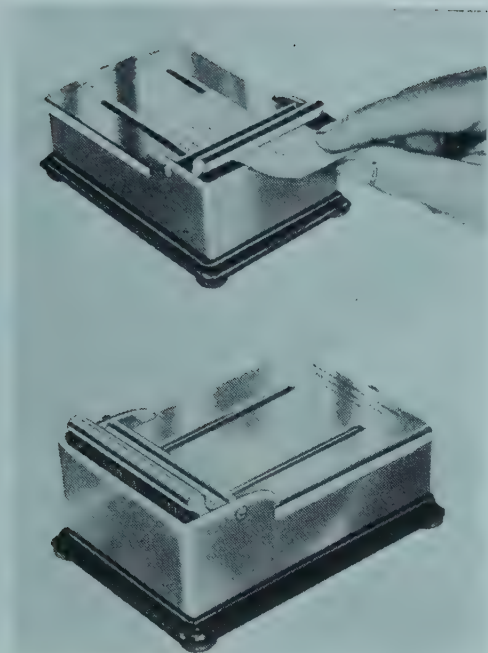


The filled packing case completely and effectively sealed with printed glued kraft tape. The case is now ready to go into store or transit anywhere in perfect safety. Note also the neatly mitred corners of the tape.

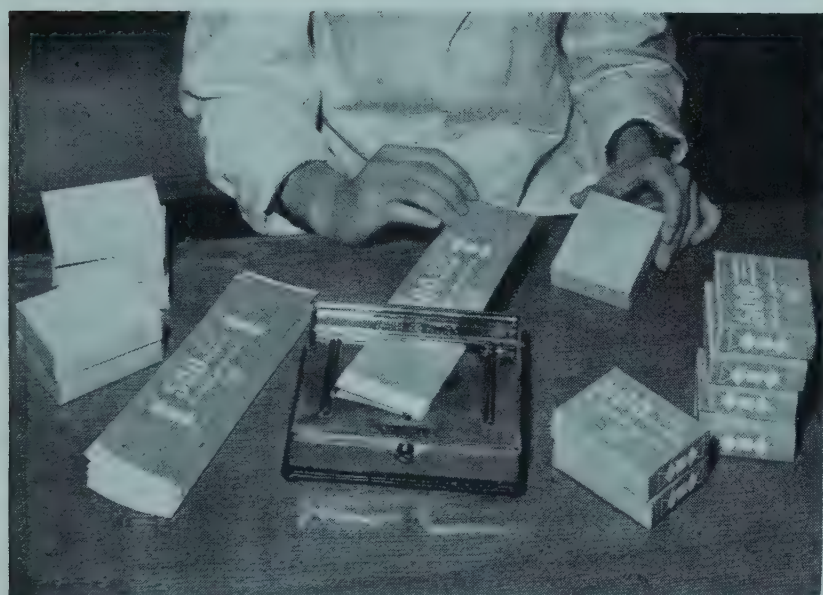
model is in the labelling section where filmic tape may be applied to the label as a cover thus protecting it from dust and moisture. Where a label is used that is unvarnished, but needs protection from the elements as a result of open air storage conditions or the hazards of transport, a coverage with self-adhesive cellulose tape can answer the purpose.

Labellers and Labelling Devices

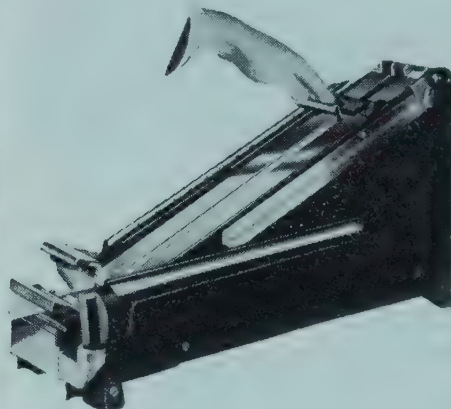
The efficient moistening of gummed labels is most important if the entire label is to adhere adequately to the surface of the product, unit or package. In the chain of product manufacture and bottle labelling, many types of machines are fitted with an attachment which deals with the labelling of the product. In this chapter, we are concerned with the labelling of units by hand methods and the application of the label on to the packed case, carton, container or kraft wrapped bale. In most of these operations the dextrine and pure gummed arabic label, printed, is used and this has to be moistened or activated for application to the desired surface. The subject of plain paper and adhesive used in labelling is dealt with in Chapter 3. The Lightning labeller device may be found on many food and beverage packing benches where gummed labels are used to label and brand products. The labeller illustrated is a 3 in. model but there are larger labellers made in 6 in. and 9 in. widths. The brushes are based on capillary action and the water supply in the tank is drawn up on to the surface of the bristles ready for moisture spread to gummed surface on the label. All over moisture in sufficient quantity is ensured and the label will adhere firmly to the surface of the product or package. The labels are merely flicked through under the feeding in bar which applies the pressure to the label



The new Rodney automatic sealing machine. Here again, the tape may be measured off in the requisite length, moisture being by controlled water spread brush device. The water supply in the tank itself is augmented by an auxiliary supply in a visible plastic tube which is fully in view of the packer so that there is no hold up for water. A pull of the lever dispenses the tape ready for application. This type of sealing machine is ideal for packeting small to medium sized parcels. Where small quantities of cartons are being packed and sealed, this machine can serve a useful purpose in the chain of production. The tape is fully protected from dust and outside damp which may be present in some factories or processes of food production. The cover protects the glued tape, the machine is simple and easy to re-fill as and when required.



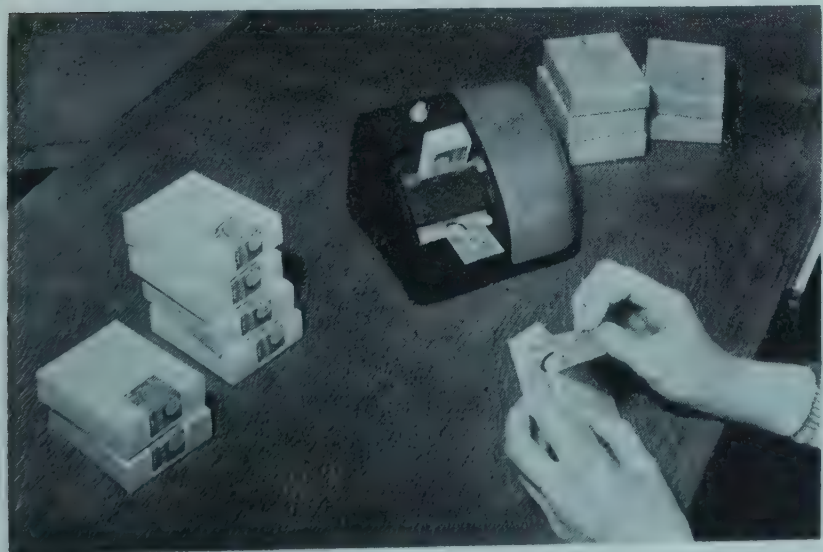
The above two illustrations show the hand labeller for moistening gummed labels.



The Counterboy sealing machine—yet another type of glued tape moistening machine made to cut off predetermined moistened lengths of tape by setting the gauge which controls tape measurements. The visible plastic auxiliary water bottle with its supply of water is seen and this flows into the tank which is the medium for tape moistening.



The new Tackytaper which will cut off clean lengths of tape as required. Here again, the tape is amply protected by hinged cover which permits quick re-fill for fresh tape as and when required.



Above and right are seen the automatic plug-in labeller for use with gummed labels.

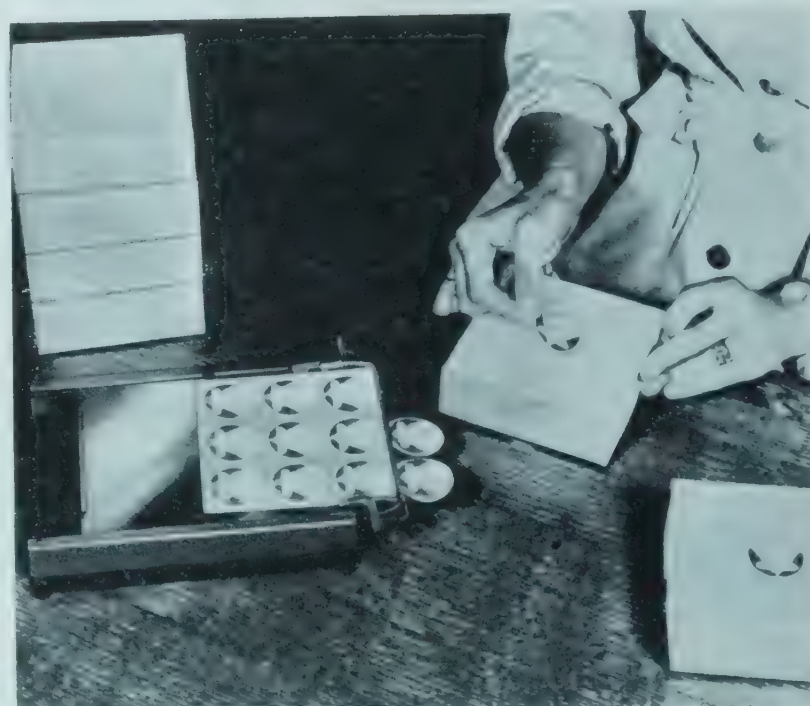
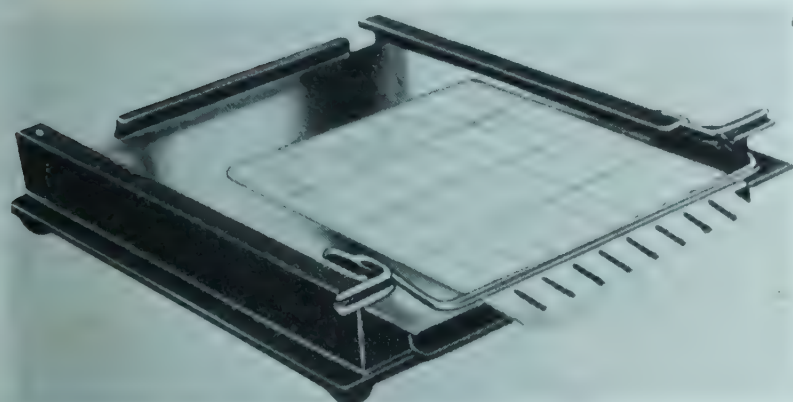
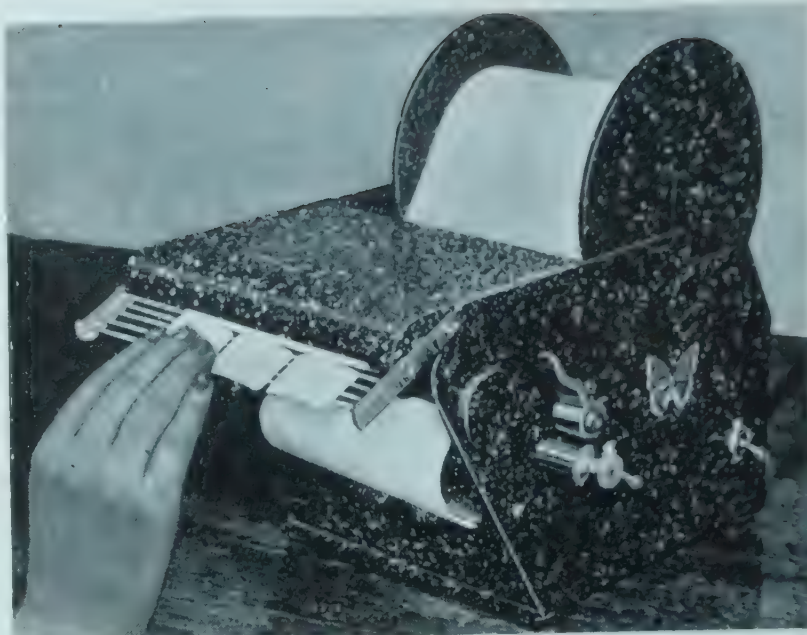




Left: Self-adhesive label dispensing machine.

Right: Self-adhesive label dispenser.

Below: Flat bed self-adhesive label ejector.



The application of self-adhesive labels to waxed cartons.

allowing it to take up the brush moisture spread. These machines are simple yet very efficient and robust and there are no working parts to go wrong.

Where large quantities of small labels are being applied to packages, products, cartons or units, an electric labeller is a very useful little machine. The labels are fed into the hopper and when the machine is switched on, the moistened labels are speedily ejected ready for the packer or operator to apply to surface or unit.

Self-Adhesive Labelling Machines

Point of sale labels are very much to the forefront today, particularly where products are priced merely up to the point of sale when the label is removed by peeling. Such forms of labelling are undertaken by the self-adhesive or pressure sensitive label and machines designed to eject plain or printed tacky labels are available. The plain labels are also used by the retailer in the food trades and in the supermarket where portions of foodstuffs, such as meat, cheese and bacon, etc., are cut off and marked with weight and price detail. Larger labelling projects which involve a printed self-adhesive label may also be dispensed on such machines. Self-adhesive labels are affixed to a backing sheet of greaseproof or glassine and the action of these machines is to release the tacky label from its backing, ejecting it ready to be applied by finger pressure to the product. These labels will adhere to many types of filmic, metal, plastic, wood and card surfaces and they have a special application for greasy surfaces.

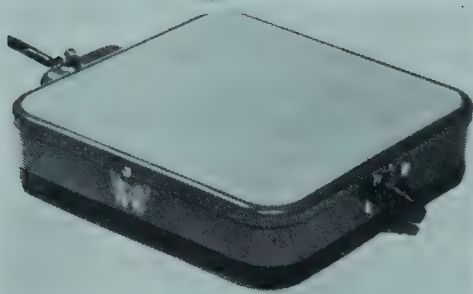
The latest types of self-adhesive label dispensers are efficient and considerable research and tests have gone into their formulation. Where temporary labelling processes are

concerned, or processes of coding, marking or pricing the product, the tacky label is the ideal medium.

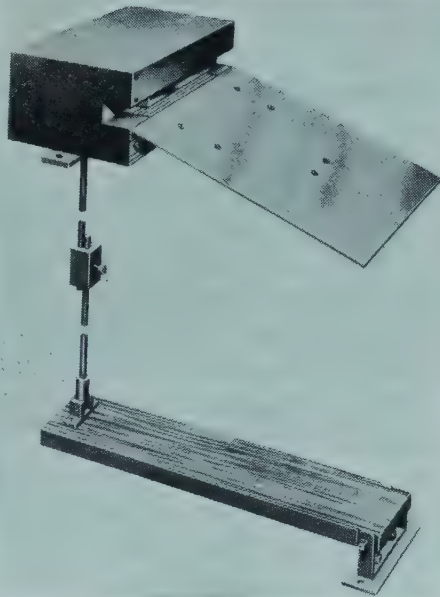
Heatfix or Heatseal Labelling Machines

The thermoplastic label is applied to the product or package by heat and pressure and this subject is amply surveyed in Chapter 3. Here, we are solely concerned with hand methods of heatfixing or heatsealing packages at the seams and ends to form the airtight closure or the labelling of a limited number of units, also the heatfixing of suitable films. Larger projects will demand a heatsealing attachment fitted to existing packaging or filling machinery such as are available from S.I.G., Forgrove, Rose Bros., Forsters, Douglas, Bland, Morgan Fairest, Rawsons, G. D. Peters, Funditor, Ayers & Grimshaw, all of whom are specialists in heatsealing equipment for individual sections of the food and allied trades. Some of this equipment which has a

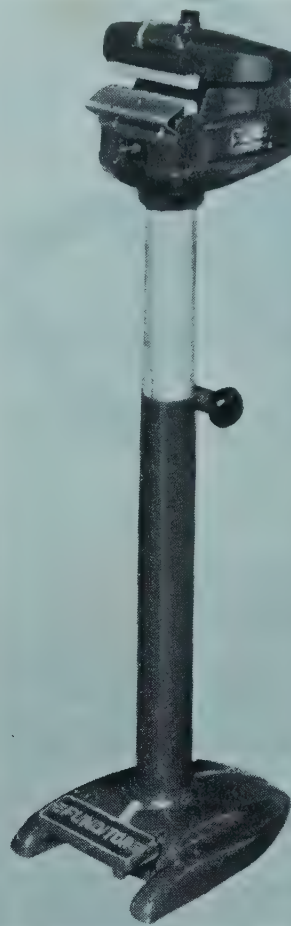
The latest type of hot-plate with plug in and thermostatic control. The heatfix labels are placed on the hotplate and removed in a tacky form ready for application to product or surface. It should be remembered that label application will vary where either instant tack or delayed action tack type of labels are in use and this is fully discussed in Chapters 3 & 7.



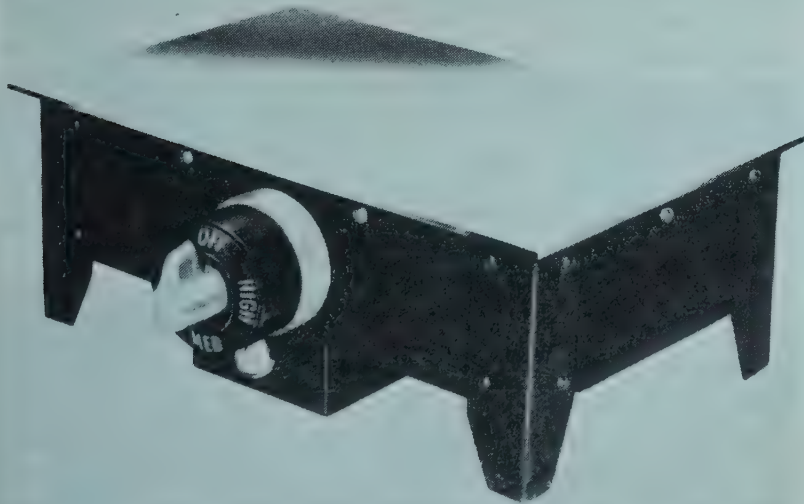
The Theco crimp jaw heat sealing machine, a foot-operated unit specially designed for the quick sealing of bags. The two jaws accurately register with each other and are both heated, thus making a crimp seal of exceptional strength. Sufficient space has been provided between the sealing jaws to allow the work to be passed through without obstruction. The robust structure of this unit lends itself to heavy duty for long periods and the foot pedal is adjustable for both height and position and the whole machine is encased in a steel housing. It may be worked on the bench — jaws vary from 4 in. to 10 in.



The Funditor 5 in. jaw model 1st heatsealing foot pedal operated machine used in the sealing of moistureproof transparent bags, now used for packaging a very wide range of foodstuffs. This may also be used for heatsealing header labels to the mouth of bags.



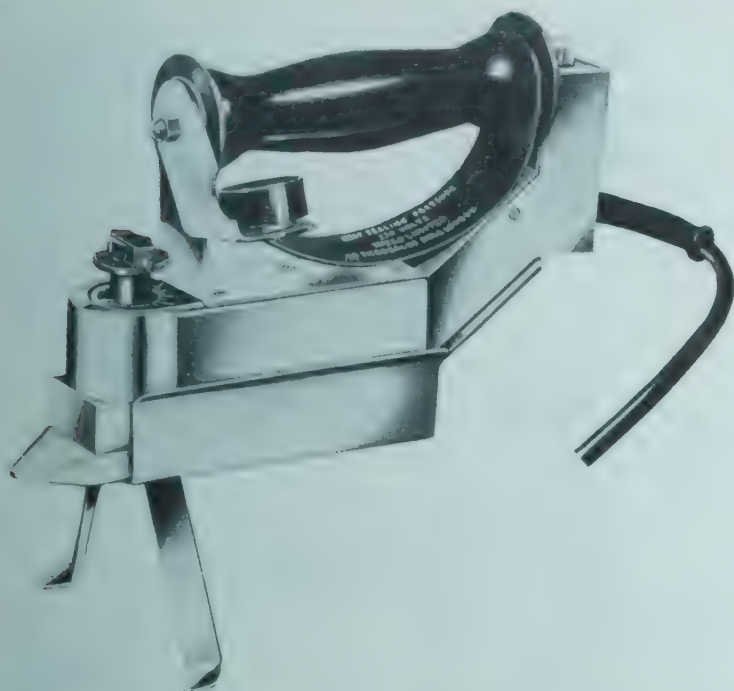
The Theco three-heat switch control hot plate. This three-heat switch control hot plate has been designed for sealing all heat sealing moistureproof film and temperature may be adjusted by means of the three-heat switch control. Other hot plates are available for dealing with uniform packages made up in Pliofilm, etc.



The Theco sandwich sealing unit. This jig has been designed for the sealing of triangular sandwiches in heat sealing moistureproof film. Its construction is such as to comply with the present regulations and is foolproof and maintains a constant heat throughout the working period. The body of the jig consists of a cast aluminium base, stove enamelled glossy white finish, having sandwich location lines in black, guide plates side and bottom for film lay, complete with specially shaped heating head. There are heat guards and rubber feet.



Wrapping, labelling and heat-sealing food products.



A thermostatic controlled heat sealing pressure iron which may be used for all heatsealing films. The appliance incorporates a pilot light and suppressor which conforms to requirements. It may be used for long periods in sealing operations without worker fatigue. It weighs only 5½ lb. and is thermostatically controlled. There are many other types of hot plates for labels and film sealing also hand heat sealing irons which are portable and may be used in any part of the factory for sealing and enclosing work.

special application in food packaging is outlined in Chapters 2 and 3.

All these hot plates, roller wheel irons, jaw heat sealing machines, have an application in the large and small labelling operation and the retailer in the food trade is rapidly installing suitable equipment for use in conjunction with food products which have to be cut, weighed, wrapped and priced or locally labelled and branded. For price and brand marking, the heatfix label is proving a boon and labels fed from machines of the Tickopress and National Cash Register types, when activated by some form of hand iron or hotplate, are the answer to on-the-spot labelling, particularly under conditions of the self-service stores. Where transparent wrapping and heatfix labels are used in processes of packaging the unit product, the final sealing can only be undertaken with a suitable heatsealing appliance.

New Developments

Semi-automatic Labelling Machine.—A new labelling machine which applies two labels in one operation is one of the range of Dutch built Essor labelling machines introduced into this country. It is semi-automatic capable of applying a body and base label to any type of cylindrical container from 4 oz. to 35 oz. capacity. Maximum dimensions of the labelled area are 9 in. long by 6 in. wide.

The labels are edge-gummed and withdraw from a centrally-placed adjustable hopper designed to take any

type of rectangular label, though label hoppers for other shapes may be obtained by special order. Output per minute is from 30 to 35 items, applying one or two labels, with one operator; the speed can be varied by changing a sprocket, and the bottle support is adjustable for the positioning of the label on the bottle and for changes of bottle diameter. It also handles conical bottles.

The glueing unit is chain driven whenever the machine is switched on, so that the glue is kept moving during temporary stoppages.

Two rollers, readily adjusted to give a different adhesive film thickness, apply an evenly controlled layer of glue on labels or sheets of any size up to 20 in. wide on various models of the Dutch-built Essor Zephyr series of whole-surface gluers. These have all recently been added to the range of machines marketed in England by Leon Davis & Co.

New Unit Applies Glued Labels to Package Ends.—A machine of considerable importance in the field of labelling is now marketed by Soag Machinery Co. It is a compact unit which will glue labels to both ends of a package. Rectangular parcels and packages are labelled at one or both ends, it is claimed, at speeds of up to 100 a minute by the Wix Series III automatic double-end labeller. The conveyor-fed machine, which occupies a floor space of only 35 in. by 21 in., can also take foil-wrapped or rigid metal packages at the rate of one a second.

Sizes of package that can be handled by the standard model are from 5⅝ in. to 12 in. (143 mm. to 304 mm.) long, but the machine can also be built for labelling lengths outside this range. Although originally designed for end-labelling parcels of cigarette cartons—an application in which the machine can do the work of eight people—it has since been adapted for handling a number of other types of articles. It is in use for double-end labelling of cotton reels, label-sealing confectionery cartons and for applying labels, which are printed just before they are glued, to the ends of shoe boxes. It is also being exported to Italy and Sweden for label-sealing the end-folds on wrapped blocks of margarine to meet the regulations laid down in those particular countries.

The labelling mechanism, which stops or starts according to the flow of packages, uses a positive suction feed and transfer and can handle paper, foil or plastics labels. Adhesive is applied either over the whole of the label's surface or in strips, and it is accurately placed so that none exudes at the edges.

Continuous agitation of the gum ducts avoids development of webbing in the gum and enables all standard labelling adhesives to be used. Detector units can be fitted to give warning when the ducts or label magazines need refilling.

Date-code printing units using hardened steel type can be fitted to one or both labelling heads, and another extra available is a counting unit to record output.

CHAPTER 11

Labels, Designing, Shape, Colour, Re-styling, Size, Types, Seals, Brand Labels, Cameos, Bi-lingual Labels, Labelling in the Self-service Stores, Labels for Air Freight

LABELS are part of the product or the process of product presentation. More and more food and beverage products are being displayed via the supermarket and self-service stores and where the product is choicely labelled in colour, it can act as a silent salesman. The first impact of the label upon the consumer is often immediate in its appeal and helps to persuade the housewife to choose this or that brand, more so where goods are nationally advertised and known. Obviously the product must be fully up to standard in all respects as first class labelling will sell a product once, but not again if the container contents fall below expected standards of quality.

Considerable interest is being taken in label design itself and national label contests are being held with a view to stimulating more and more interest in this aspect of product presentation. Exhibitions of label styling and design are a new phase in display and designing, and printer and label users are frequently invited to submit their labels for open contest, prizes and cups being awarded for the adjudged best results in this field. Labologists, as they are now



A store display counter where labelled cans, printed waxed cartons, foil wrapped products, card cartons and boxes demonstrate the wide variety of materials now used for modern food packaging.



A modern fresh frozen foods display cabinet which emphasizes the true value of enclosing, sealing and labelling the product. Colour, style and design all help to play their part in the immediate choice of a brand or product.

termed, are also taking an active part in organizing label exhibitions and contests and already a large band of label collectors has grown up in the U.K. engaged in collecting old and new labels of all kinds. The label has gone far beyond its former conception of function of merely identifying the product; it now has a job of selling to do for the manufacturer or the packager.

Labels brand, identify, grade and add the 'hall mark' to the product and in view of their role in product presentation, the label should be taken far more seriously. In this chapter, we are chiefly concerned with product labels for the bottle, carton, case, package or container and not the label used for marking bulk merchandise packed in wrappings or fibreboard cases. These too must be fully considered from the standpoint of a packager's or packer's goodwill and they certainly must adequately mark and fully direct bulk packed merchandise. Considerable attention has been given to the basic papers used for labelling throughout this book and it is not proposed to review the various types of papers used by the printer for label production. To sum up label paper

availability, one must bear in mind that there are dextrine or pure gum arabic coated label papers designed for application to almost every surface and for use in all the four corners of the earth in cold or hot climate. There is no surface, however remote or difficult, that cannot be labelled by some suitable medium. Heatfix or heatseal thermoplastic labels will seal various kinds of filmic wrappings and bags; self-adhesive labels will pressure label many types of containers of the greasy or waxy type, among other surfaces. Most of these grades of labels will adhere to tinplate, plain and lacquered, printed surfaces, paper and board based containers, plastics, glass, wood, metals and other materials used in the make up of modern food and beverage container. There are the paint, burnt-in slide-off varieties of transfer which will label, permanently, many types of enamel, glass and metal surfaces and there are a very comprehensive range of liquid adhesives available for the labeller using automatic and semi-automatic processes of product labelling.

Common Fundamentals of Sound Labelling

(a) The label should be worthy of the product and the skilled advice of the label specialist or his designer sought, considered and adopted if found suitable. The design should have some relationship to the product or its uses or place of origin of raw materials. These are some interesting factors which can help to make up first class factual designs.

(b) A picture is worth a thousand words and too much small type or letterpress is often unnecessary. A good design in colour will tell the story in such a way that it makes an immediate impact upon the purchaser at the point of display or sale. Well-labelled goods appeal to the retailer and often influence him to give them longer and more frequent displays. Where only a little copy is necessary, this can be printed on the carton, added as an additional small label or printed on band edge entirely divorced from the main label itself.

(c) The label should be well printed, the process having relation to quantity and basic paper used. Letterpress and lithographic processes of printing are among the most popular, while silk screen printing, where full rich colours may be obtained, is ideal for short label runs for the high class product. This process has a special application in the transfer process of labelling.

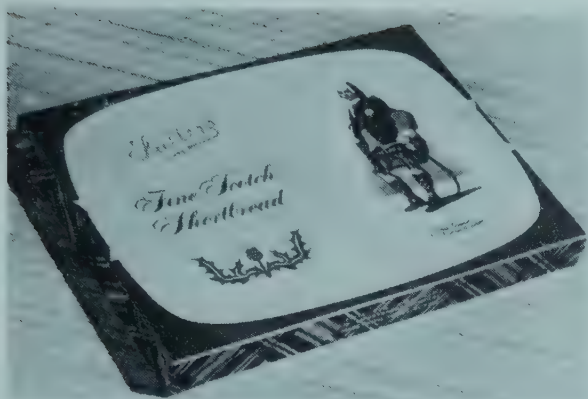
(d) Colour and more colour should be used where practical and compatible with the product. Colour sells and attracts but it should have some bearing upon the product or the contents of a container. Far too many labels are printed upon white base papers. Coloured papers cost little or often no more than white yet they can make just that important difference in product display and selling. Many food and beverage packagers have made their product nationally known by a coloured label. Cadburys, Nestlé, Ricketts, Kodak, and Fullers are but a few organizations who use a coloured label to present their products and such packaging is immediately recognized by the buying public. A coloured paper printed in a single printing gives a two colour effect at the cost of one printing and where it is a question of economics, this simple factor should be remembered. A nut brown coloured label paper printed in sepia will give a two

colour effect to the finished label and there are hundreds of other colour combinations to be worked out with the label specialist or the printer.

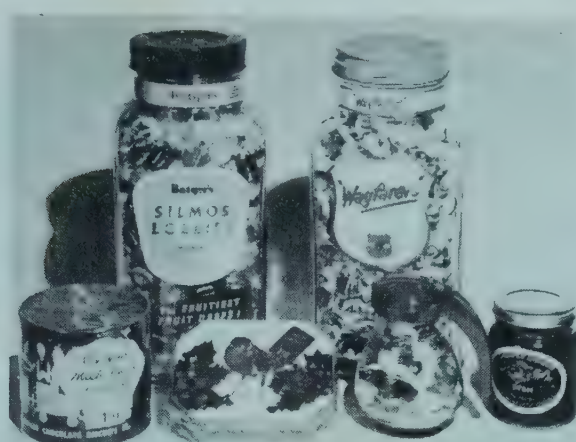
(e) The best label paper should be chosen for the job, i.e. coated paper if possible, metal lined or surface coated. The better the base paper, the better will be the finished appeal of the label. The printer is able to produce outstanding results on coated label papers with the many new printing inks that have been formulated to meet the latest types of label paper. Progress too has been made in metallic printing ink and some first class results may now be obtained by using gold, aluminium, silver or metallic coloured inks. The new cast coated papers make first class labels for the high class food product and for wines and spirits. These high gloss labels do not need varnish, cellulose or supergloss treatment after printing and in this way, they save the additional surface treatment to printed label work.

(f) Label durability is often important and it should be remembered that printed labels may be made more durable, fingerproof, waterproof and dustproof by an after treatment of some form of lacquering such as varnish or cellulose. Chapter 6 deals with these treatments and they may be considered where the label needs some additional enhancement or protection from handling or moisture. (A note may be included here concerning the bulk merchandise label which is exposed to outdoor treatment. Here the label may be suitably varnished to render it waterproof or weather-proof or it may be covered with strips of self-adhesive cellulose tape which does not conceal written details.)

(g) Obviously, the best adhesive for bonding or adhesion to a surface to be labelled must be chosen and the various forms of label application by hand or machine must be fully considered before marketing the product. Labelling projects are part of the process of manufacture and should be initially taken into account at the onset of the project. There is no one adhesive paper made which will adhere to a wide group of products throughout a range of assorted containers. Each surface must be considered from the standpoint of adhesive contact and application, bearing in mind the quantity to be labelled. Glass, waxed cartons, tin plate, plain and lacquered, printed surfaces, wood, paper, cardboard, fibreboard, metals, plastics, earthenware, china, are but a few of the materials used for food and beverage packaging and each one of these may be labelled with a different label paper or liquid. Trial tests may be made with cut label blanks to ensure that the best adhesive recipe is chosen for the job. In addition to label quality from the standpoint of paper, the question of substance or weight may be considered and a buff antique label paper makes an ideal medium for the beverage label. It has substance or weight, pale colour and an embossed or laid finished surface which helps to make it attractive as a label. Often the paper can do the work in conjunction with the design and such papers should not be covered by printing or matter, but the base paper should be allowed to be seen as part of the label background or design, in other words, the chosen material should be so designed that it plays its part as an integral part of the label pattern.



Fuller's Scotch Shortbread label applied in conjunction with a Tartan Clan fancy wrapping. The label is bright and well-printed in colour. This type of packaging converts the product into a gift package ready for immediate presentation or posting to a friend.



Glass and metal containers some of which have an after-use value. Shape largely contributes towards the final presentation.

types of products are to be displayed and where goods are mass displayed, a harmonious composition or design should result and this should be equally pleasing where small quantities or unit containers are displayed. The label therefore must be considered from the standpoint of unit and mass presentation, the colour and design blending together under each circumstance to make a pleasing picture. In these display conditions, colour and label shape can play their full part in the ultimate design of the display.

Label Designing

Most manufacturers and packagers have their own ideas about label design and obviously they know more about their product than the outsider. However, there are label printer specialists and designers who are able to provide first class designs based upon the product, its uses or application. Joint consultation is recommended and it will be often found that the onlooker sees most of the game. Where a label designer is engaged in the production of an idea, he should be given full information and scope, the finished suggestion being considered and modified where desired or necessary. Earnest consideration should be given to label design as it has to live a long time with the product on display and in the home of the consumer. Once chosen, it should not be hastily changed or completely re-styled.

Most label printer specialists and designers would agree that the label has to look well where the product is displayed as a unit and equally well where the product is displayed *en masse*. The retailer determines how many units and what

The label should have some relationship to the size and shape of the package or container, not too large or too small. In this respect, the experience of the designer can be valuable. Often the label designed to take the shape of the contour of the bottle or container can be most attractive. The Heinz label is a good example of shape. Instructions should not be printed on a product or brand label but reserved for the container insert leaflet or the additional small label often dually used on the reverse side of the bottle or package. It must be kept well in mind that the brand of product label is there to sell and not inform or instruct. Label design should be given ample air space, that is open surface which generally helps to throw the picture out in bold relief. Deckle or feathered edges to the labels in suitable cases are attractive and this may be taken care of by the label specialist. Buff antique label papers lend themselves to feather edge treatment and such labels make first class beverage labels. Label design means so many different things that it is impossible to generalize on the subject as



A form of printing labels where long runs are required. In this form, the label is often treated after printing to a lacquer of varnish or cellulose thus further enhancing the printer's craft, bringing out the rich colours of the design. This treatment renders the label waterproof and dustproof.



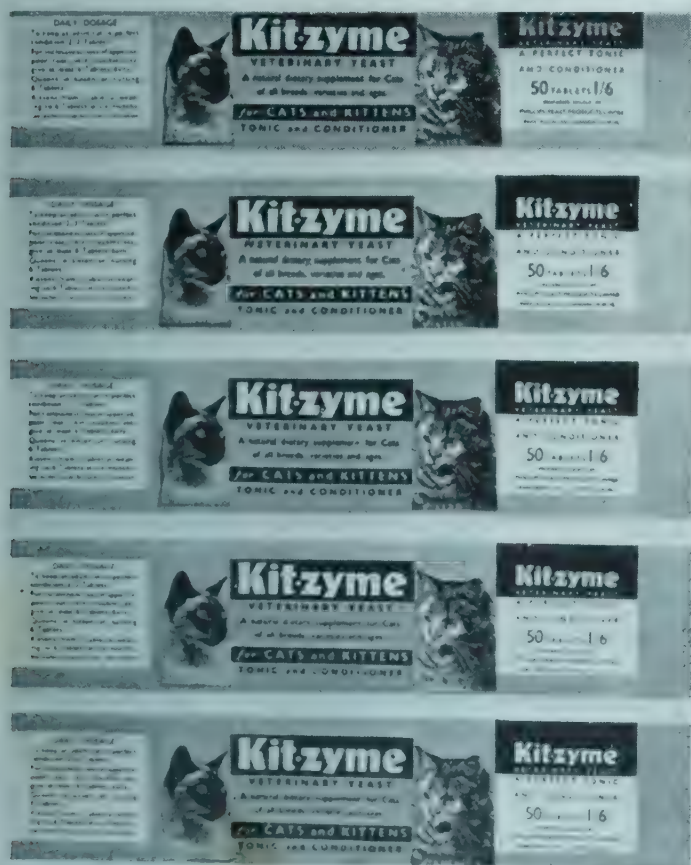
This illustrates shape in the label, some of which have been restyled in order to bring them into line with current appeal. Shape plays a large part in the final presentation of the bottled beverage and circular canned and packaged food product.

each product or groups of products must be separately dealt with by the specialist in conjunction with the packager.

Generally speaking, design can include shape, colour, style, picture appeal and these are carefully studied by the printer specialist.

Label Shape

There are far too many square and rectangular shaped labels in use today and such types of labels do not add very much to the appeal of the product, either from the standpoint of display or point of sale presentation to the customer. Such labels may often be described as an identification label not designed to sell the product but merely to mark it out for recognition. The same label, may however, be converted into an attractive or an appealing selling medium if only some kind of shape were introduced to render it more individual. Shape costs no more than the square or rectangular label; it is merely a matter of cutting or punching to another form, and often at no extra cost, the existing nondescript shape. Where special shapes are desired, such as those which follow the contour of the container, an initial steel punch or die is required and this costs very little extra and such costs soon become spread over repeat orders. Any type of label shape, however simple, has to be cut on the press or guillotine and shape can cost no more in most cases. Trade label cutters have many types of punches or cutters capable of producing many interesting designs and from these cutters, where the label is printed in the full sheet, the units may be punched out to shape as chosen.



This again illustrates the method of label printing. The label is well designed and printed and fully illustrates the contents. The daily dosage is printed as an end to the label which appears at the reverse of the can for the guidance of users.



Robinson's Lemon Barley Water label which is so well known to the public in the labelling of the bottled product. These labels are most attractive and in mass display form they cannot fail to draw attention to the product.

Such shapes as ovals, diamonds, hexagonal, circular, and labels with rounded corners are easily produced by the specialist, and this is additional to the specially designed or shaped label punch which is the sole property of the packager by arrangement. Label shape soon becomes recognized and the product is therefore indelibly focused in the mind of the consumer. Colour and shape together go a long way towards sales development and product choice. Any types of printed or plain paper may be punched out or cut to size and shape by arrangement, no matter how thin or thick the basic label may be. Having decided upon a label style or shape, its application must be perfect being neatly and firmly applied to surface. Whether the label is applied by hand, semi-automatic or fully automatic methods it should be perfectly applied without wrinkles, creases, cockling or dirty finger marks. The label should be in position and not out of true as this will create a poor impression. Shape makes the label an integral part of the container or package and it will be found that any error from the label application standpoint will be less obvious in the shaped label than in the square or rectangular shaped label where out of alignment application will be immediately obvious. The labelling of bulk packed or fibreboard packing



Specially designed labels to conform to the contour of the pack itself therefore becoming part of the finished package. The Bulmer labels are choice in their design, colours and attractive shapes and lend appeal to the bottled beverages they identify and market.



cases filled with merchandise need not be so accurately carried out in this respect but it should be borne in mind that most progressive packagers regard the label as part of the product and its presentation for sale.

Colour and the Label

Monotone or black and white is the skeleton on which to clothe life and colour. Colour is not only a physical phenomenon; it fully and often exotically vibrates life itself. It has been wisely said that life, light and colour express vital energy and the unity of creation; every vibration of light, from the celestial blue of the skies above us to the dullest and darkest lump of coal, is fully alive with colour. In this case, man is only on the threshold of its infinite possibilities and potentialities. Colour is life and in selling, it must be taken fully into account. Colour may come from the product itself or the form of presentation or container. Where the product is plain, it can be suitably brought to vital life and appeal by the coloured label. Many medium and large organizations in the food and allied trades sell their products on colour in some shape or form. Much may be done to enhance the label by the introduction of colour to the plain or an additional colour where one or two only are used. The packager and the label printer specialist are amply aided by the vast panorama of colour in the form of label papers. Coloured papers and metal coated papers of every variety are now available so that colour at some stage of the label project may be introduced by either printing ink or coloured background paper. Colour should be chosen bearing in mind the product and its character. Some colours are aggressive while others, more subdued, are soothing and create the best impression, but this all has reference to the product itself.

Some colours are accepted relative to their value and the following is a brief review of colour significance from the industrial standpoint:

Red.—This is an aggressive colour, it immediately attracts attention, but does not always create the best inward feelings. It signifies heat, fire, vitality, danger, poisonous substances but may be used with advantage for announcements, sales bills, window stickers and notices which require immediate response.

Yellow.—Golden shades, buff and creams are very pleasant

colours and signify golden sunshine, ripening corn, a field of wheat, autumn and the harvest. They may be used to advertise or as label colours for suitable food products, biscuits, cakes, etc., or products packaged around autumn from the harvest, for bottled fruit beverages to denote health, vigour and sunny days.

Green.—Nature's own special colour, cool and refreshing and a shade of green always seems to combine well with yellow, two of nature's most popular spring-time combinations. The leaves are many shades of green and this in conjunction with some kind of floral combination, can serve the purpose of a motif for food and beverage label work. The vast degrees of green from pale nile green to deep residia afford the designer ample scope for the incorporation of a green into the label.

Brown.—A healthy colour associated with natural products and foodstuffs, matured wines and spirits, tawny ports and the like. Brown obtained from a buff antique or nut brown tinted paper makes a first class label for many kinds of health giving products. The label produced therefrom does not readily finger mark and looks pleasing at all times.

Blue.—A good colour for infant foods having some resemblance to landscapes, the clear blue skies, clear crystal water or running streams, pale and delicate blue flowers. Blue is a clean and healthy colour and is often associated with the nursery and corresponding product.

Pink.—Clean, healthy, often robust and a good colour for foodstuffs for the delicate folks. Baby foods and the nursery may use a pink colour or background for the label of the product.

White.—As a background has a clean and healthy to pure appeal and this is exemplified by the well known Fuller's white box label and enamel covering.

Gold, Silver, Aluminium and bright metallic colours are available to the packager for wrappings, seals, cameos and labels. They are obtainable as packaging materials, box covers, labels and in the form of metallic ink which is the responsibility of the label printer specialist. Metallic papers or coloured inks add tone, dignity, vitality and elegance to the packaged product. The packager in the soap, perfumery and cosmetics industries has long recognized the value of such mediums for labelling high class products and they also

have an application in the labelling of certain kinds of food-stuffs and beverages. Some colours give the effect of increased size, others tend to act in the reverse way, others such as blues, create an impression of distance. All this comes about from the focusing apparatus of the human eye which changes for the colours at either end of the spectrum. For this and similar reasons, orange and red shades tend to give the appearance of nearness or compactness. These may have a bearing where small products are being labelled and where the label has to be outstanding in appeal but without very much space to perform its task. Warm colours which radiate cheer and good feeling should be used for various kinds of summer beverages and picnic foods.

Label Re-styling

New life and vitality may be introduced into the label without altering the design. Colour and shape can accomplish this change-over. Where an established label is fully accepted by the public and immediately recognizable, the changeover should be very gradual so that when the ultimate design has been formulated, the public have come along with the style without being very much aware of the change. Some brands of sauce emphasize this point. Some folks feel that a new label means a new product and much of the goodwill attached to a brand or name may therefore be suddenly lost. No rapid or sudden change of label design, colour or shape is recommended. Changes in label design have recently taken place in the presentation of sauces, pickles, jams, and certain nationally known canned goods but these have been very gradual, the change being hardly perceptible by the public or the retailer.

Often a change in label design is essential where goods are mass produced on a new production line. In such cases, the process of labelling or label application has been varied or new forms of label have been used. Modern methods of packaging and current machinery used for filling and labelling often call for some form of label re-styling and this may have a reflection in label shape, colour style or method of supply, i.e. in units, on the reel or in perforated form. Re-styling is the work of the label designer or printer specialist and the packager should always take full advantage of the service readily available in this connection. Many types of food labels in recent years have been completely re-styled without losing anything of the former tradition or prestige value attached to the label as a brand mark. This should be the keynote to the new label for an old established product. Incorporate the best of the old with the tone of the new. Many labels have some traditional value and this should not be entirely lost. The label is the manufacturer's or the packager's hall mark and must be rightly regarded as such.

Attention is being focused upon the methods of selling in the supermarket. Most observers agree that the public are now making their own choice of brand and this is amply 'put over' by the coloured, shaped and well-designed label. Eye appeal is the order of the day in this modern field of display and selling and where the retailer busies himself with other duties, the buying public select this or that brand without guidance, being encouraged to do so often as

a result of the pack and label. A modified label with trends towards current methods of selling can be all to the good in the food and allied products field. Age-groups vary and new buyers constantly come into the field. New designs are accepted by the teenager but the more mature shopper likes establishment. A happy compromise must be met between these two factions, and it is within the bonds of possibility if the advice of the specialist is sought and carefully considered from the standpoint of practicability. Product appeal, presentation and label design are all part and parcel of the project, and the packager must keep abreast with current trends.

Label Sizes and Types

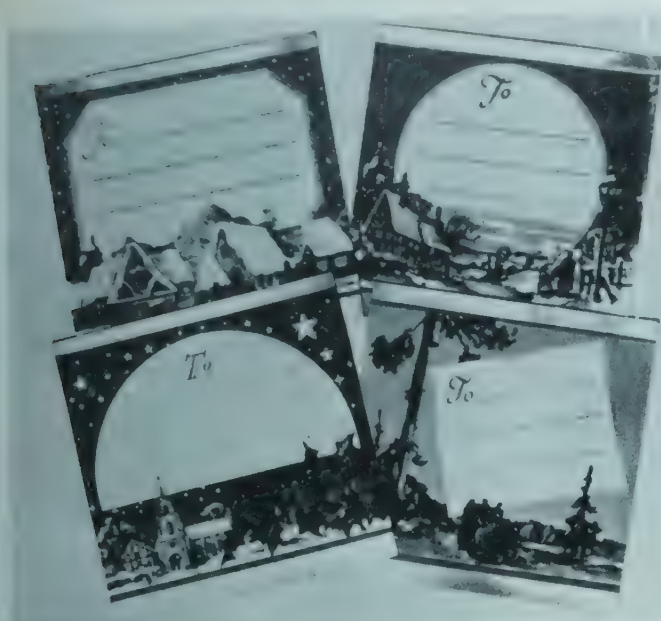
Label size has some relation to the dimensions of the package and product. It should be sufficiently large to be seen and clearly identified at a reasonable distance while the product is on display in the shop window or on the sales counter. Often a glass container is made with a view to taking a specific size of label which fits snugly into an indent. Where goods are labelled for transit, as in the case of bulk and case packed merchandise, the label should be sufficiently large enough to be seen immediately any kind of inspection of consignment check-up is made. Larger and brighter labels could be employed on many consignments of products packed for transit as this helps in store or transit in the quick and easy recognition of a batch of goods. Many merchandise labels are far too small and must result in delays, however limited, where goods are being examined or sought and where they are conveyed on long journeys often under conditions of darkness and examined under artificial lighting.

Label size will also have a bearing upon the form of application, speeds and quantity of units to be dealt with. Printers often package printed labels in small packs of 250's or 500's where the unit or individual label is concerned, but this may be specified as found convenient to the packager or labeller himself. Labels are also supplied in sheet form and may be cut to units as and when required. Labels may be perforated in either sheet or reel form for automatic feeding into labelling machines. Many label printers package their jobs in wrapping paper with an inner protective lining of waxed paper thus forming a barrier against moisture or damp. This is sound packaging where gummed labels are being used, as it will assist in non-blocking or curling of the label. Labels printed and cut into small sizes have a tendency to curl but the best brands of non-curling gummed label papers are proof against any tendency for this defect. Label supplies are often stood best on their edge as this avoids direct weight as opposed to stacking them on top of one another. All kinds of labels are best stored away in a dry room or warehouse away from extremes of heat or damp, and certainly well away from cold stone floors and draughty gangways. Label types vary very considerably from the advice or instruction sticker, the ornate product label, to the seal, cameo and merchandise label. All of these are supplied in various forms but this can be specified at the time of buying.



This selection of illustrations shows the increasing popularity and application of the seal, cameo and brand end and packing label. Made up from a very wide variety of base materials, metal foils, enamel and surfaced papers are very popular for this class of work which is produced rotary on seal printing machines. Most of these seals and cameos are embossed, being completed with serrated or fancy edges and most have attractive shapes and good colouring. With suitable dextrine, pure gum or heatseal recipes, they may be applied to packages by suitable labelling mediums as outlined in Chapter 10. There is practically no limit to both style and shape and the seal producer is a specialist in producing some outstanding and individual designs. Bottle neck labels and end packing seals also come within this field of miniature labels and these add the finishing touches to the final package. They may be either water activated if they are produced on gummed label papers or applied by the hot plate or hot iron if they are thermoplastic labels. Where miniature bottles, jars and packs are produced for the house party or the children, some interesting type of reduced size label often makes the pack. There are also various kinds of novelty shaped labels which have an appeal in various directions and may be used as stickers to advertise certain kinds of branded foodstuffs. Examples of these are Lyles Golden Syrup, Trex and Lazenby's Fruit Salad labels as illustrated.





These are the more recent greeting gummed labels packagers are using as additional labels applied to certain kinds of food products which have a seasonal or greetings appeal. These labels may be obtained in bulk and often bear some greetings message. Designed in different shapes and sizes, they can be used for various purposes and occasions, not only Christmas but also such things as birthdays, weddings, mother's day, christenings and so forth. Producers and packagers of products which fit in with gift appeal purchase ideas may well consider the merits of the seasonal or greeting label or seal. Greetings seals and tags have a traditional value in that certain designs, e.g. Father Christmas, robins, coaches and holly motifs are constantly repeated.

Seals, Brand Labels and Cameos

Fruits, such as melons and bananas, often carry a brand label and here a special adhesive label is used for the purpose which gives a first class stick to the product. Many other food products, fruits and vegetables now carry a brand label, seal or cameo, many of which are produced on metal papers in the form of a punched out seal. Most of these seals and comeos are printed on a special basic paper which carries an adhesive coating designed to adhere to some special surface and advice should always be sought where new products are being considered for labelling. There are specialist cameo and seal printers who produce the most attractively shaped embossed seals, often with fancy or serrated edges, such forms of brand labelling providing the seal or hall mark for the product. More and more food products are being brand labelled in this way thus adding a touch of quality to the finished product. There are a whole range of papers suitable for seal and cameo work and in addition to the wide range of adhesive coated metallic and metal lined papers, there are surfaces, enamels, flints, friction glazed papers, calf papers and the more recent cast coated papers which all have an application in this form of labelling. The brand label may be used as a seal thus enclosing the seams and end flaps of a package or filmic wrapped product.

Bi-lingual Printed Labels

Where a food and beverage packager is handling products for the export markets, some consideration should be given



to the importance of printing labels in both English and the local tongue. This is for the convenience of the retailer on the spot who is thus better able to demonstrate and describe the product and the ultimate user who likes instructions printed in his own language. Trade names and branded products do, of course, retain their name all round the world, but certain features of the label should be varied to suit the country of importation. As has been pointed out elsewhere, competing countries exporting to areas in Europe are printing their labels in French, Dutch, Spanish, German and English where they apply. The U.S.A. appears to be fully aware of the importance of the bi-lingual label, and if exports are to be increased or even held down, every consideration should be given to this important aspect of labelling.

Stock Printed Labels

Gummed labels, tapes and seals are readily obtainable from stock with printed wording and often these have an application in marking, branding, coding and additionally sealing products. Standard printed designs for seasonal greetings purposes are also available in the form of tags, labels and seals. These carry a special greetings message appropriate to the occasion of the year. 'Seal of Quality', 'Guarantee of Purity', 'Caution', 'Greetings', are some of the stock wordings now available in label or strip form with suitable adhesive for sticking to all kinds of surfaces. First class design, lettering and style are incorporated in the best grades of stock printed labels. Guarantee tie-on tags are

another form of label which have an application in unit packaging where a product carries a brand mark of this kind. Some tie-on tags are novel in style and have after-use, such as book marks. Many of these specially printed labels produced in the form of seals are printed on a double seal gummed paper, an adhesive grade which will adhere to many difficult surfaces.

Labels for the Self-service Retailer

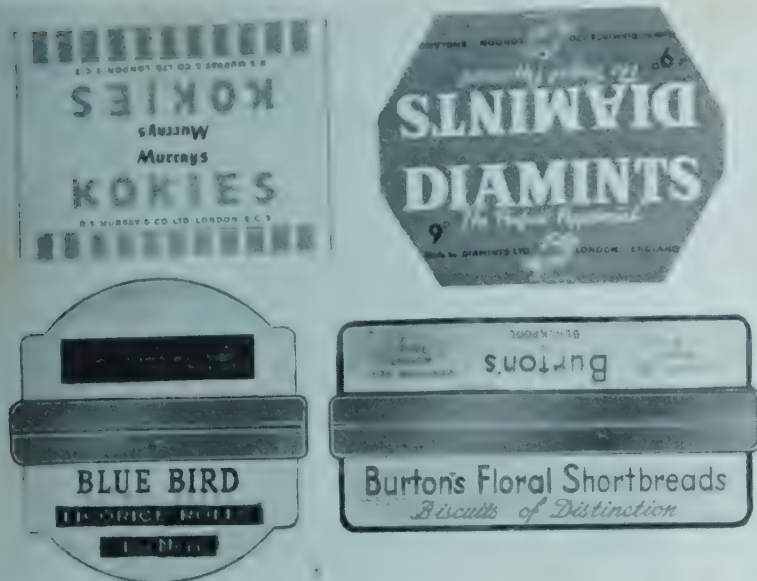
There are many aspects of self-service but it may be safely prophesied that this form of display and selling is not a passing phase but something which will grow. From the labelling standpoint, all forms of convenient label adhesive are essential in this method of marketing the product. The increased attention given to packaging by manufacturers in the food and beverage trades and the ever increasing popularity of customer selection of the product from an open counter, self-service is the logical solution to many of the economic problems the grocer and the retailer in general has had to solve. Self-service has also brought about new forms of labelling for the purpose of price and weight identification. There are self edge forms of pricing but these must be connected with the groups of products so displayed if they are to prove of convenience to the shopper. It is better to label or mark each product with a price label so that there can be no confusion and here the self-adhesive label is best as it is easily applied to any surface by finger pressure and removed when no longer required by peeling. Individual pricing is often best where goods are selected for examination and wrongly replaced by the customer. Price marking helps the assistant who checks out the sale. How often is the manufacturer's or packager's beautifully printed brand label carelessly marked by rubber stamp or pencil. It impairs the presentation of the product, but fortunately more and more branded and labelled products are being additionally priced by a separate label. Ticketing, as it is termed, overcomes the packager's reluctance to incorporate in the label design of their packs and cans, a blank white space for price marking. This can mean that where a price change takes place, the old figure has to be altered or crossed out to the general detriment of the pack appeal. The retailer finds that the use of a suitable adhesive label for adding the essential detail to the package works well with some form of small printing machine. Machines smaller than a typewriter are available which assist in the printing of labels and this can also help at stock-taking periods. Different colours may be used for coding batches, either as labels or coloured inks. Plainly printed price labels are accepted by the purchaser without hesitation while often the pencil written detail is subject to dispute. Printing machines will add all details neatly relative to price, size, weight, supplier's code or initials, date, code, country of origin, quality or grade as required. Although a wholesaler delivering packs of imported fruits or vegetables, for instance, may be under no legal obligation to indicate their origin, the law expects the retailer to ensure that the word 'Imported' appears in letters half an inch high on each package. By using an adhesive label with the words 'Imported' added to its printed detail, a retailer



Biscuit end seals or brand packaging labels used to enclose packaged biscuits. These are printed on thermoplastic heatfix label paper—delayed action type of coating so that they may be heated on the hot plate away from the package and applied as a separate operation. Where fragile or heat sensitive products are being heatfixed or heatsealed, the delayed action type of label is recommended, in fact, it should be employed for such similar processes. Labels of this kind are produced on special seal printing machines rotary type for application by automatic packaging machines with a heat-sealing attachment incorporated.

selling British packed foodstuffs of foreign origin avoids any suggestion of misrepresentation. Although very few packs fail to tell the whole story sufficiently to the customer, some do fail in this important respect. Questions cannot be answered in all instances under conditions of the self-service store and often the busy retailer has no time to enlarge upon the merits of a product. Where such conditions may prevail, local detail relative to a particular product may be marked by an additional adhesive label or incorporated in the price ticket. This relatively new form of printed labelling, carried out on the spot by the retailer is speedy, inexpensive and very neat. Professional looking printed price tickets or labels may be produced on such machines as the Tickopres merely by turning a handle.

Such machines are designed for retail printing and occupy small space in the store. Both manual and electrically operated machines are available and they may be used by the youngest assistant with perfect ease. Tickets on the reel are printed at the rate of some 150 per minute and they may be printed at slack times ready for pricing or marking products. Stereos or plates may be used for often repeated details such as 'Empire Cheddar', 'Best Back Rashers', 'Empire Dairy Butter' and so forth.



Four header labels produced on heatfix thermoplastic label paper. The double label is folded over in application enclosing or sealing the open mouth or end of the filled bag, which in most cases, is made from filmic material. The header label is both a form of sealing or closure and an advertisement for the enclosed product.

Festive messages for seasonal times may be incorporated in the printed label, coloured inks being used to give the finished label more appeal. Any sales promotion literature received from the distributor of products may be overprinted with the retailer's own name and sent out as direct mail. Special adhesive trading stamps may be designed by the makers of these machines.

A further example of the service rendered by these machines is outlined by their application in the dairy industries.

Labels for the Self-service Retailing of Dairy Produce

As label-printing specialists, Tickopres Ltd. are well-known to both the manufacturing and the retailing side of the dairy industry.

Their interest commences with milk-churn tags. These tags are supplied preprinted on a light card. Using a small Tickopres over-printing machine, the dairy adds the names, addresses and other data needed to identify the individual suppliers. When the churns are filled and ready for collection, the farmer's foreman marks the gallonage and time of milking in ink.

Among other applications of these labels and overprinting machines in the dairy industry is the date-coding of ice cream.

Since the development of self-service methods of retailing, the company's studies in London and Harwich have designed scores of labels specially for the self-service retailing of dairy products. Many of these perform the dual role of contents label and price ticket, enabling the potential customer to obtain at a glance all the information she needs to know.

In some of these designs, only the name of the supplier or his brand name, or the distributor's name, together with

a slogan such as 'Pasture Fresh', are preprinted. Others also include in their preprinted detail sales promotional information, such as 'Vacuum Packed for Sealed-In Freshness', and instructions for users, for example, 'On arrival home please loosen the wrapping.'

Spaces are provided for the insertion of the net weight and price of each pack. Weights and prices are entered either in ink in pre-packaging departments or are neatly overprinted by a shop-sized machine. With cheese tickets, it is usual for the overprinting machine to add also the name of the cheese.

This company recently announced that they will fully preprint these self-service price tickets with prices, quantities, weights, date coding and similar details specified by the user. In the past, printers found that this work, entailing detailed overprinting, was uneconomical. A newly organized production line, however, enables this firm to accept orders involving up to ten changes of detail in each reel of only 1,000 labels.

This in itself should help to eliminate the scrawled detail that still disfigures labels in some self-service stores, but label designers have also tackled the problem of the traditional white price ticket that they feel often spoils the appearance of a pack.

To enhance the sales-appeal of the hygienic conditions under which milk products are processed and packed, Tickopres now supply self-service labels that are coated with a high-gloss finish to suggest dairy cleanliness. These labels have a shiny surface that is hard yet flexible. They are normally available in any of five colours, but users may have labels in papers and inks that conform to their own colour-schemes.

Whether supplied singly or on the reel, Tickopres labels are available in all shapes and sizes. Standard widths range from 11/16 in. upwards.



The famous Nestlé Condensed Milk and Milk Chocolate pack. Here, the label sells the product and is internationally known as a result of colour and style in labelling. These labels have to be cut to very fine limits indeed in order to avoid the jamming of high speed labelling machinery.



Self-adhesive or pressure-sensitive labels have now become established for temporary labelling all kinds of products up to the point of sale. They may be used for price, weight or batch marks. The more recent forms of poultry packaging have found the tacky label ideal for branding and marking and Frostrow is an example of this form of current labelling. These labels adhere to many surfaces such as plastics, metals, tinplate, films, wood and paper based materials used in container making, in addition to glass jars and bottles.

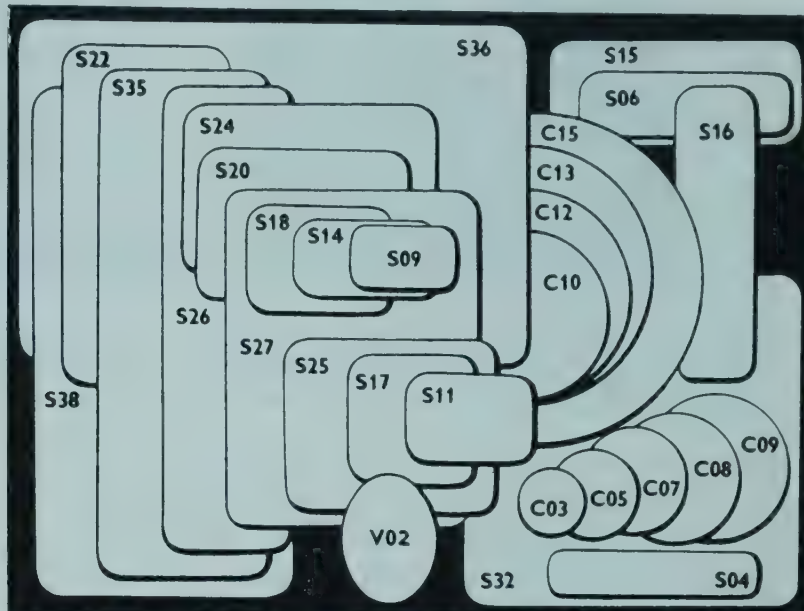
The standard perforation is arranged to enable reels of labels to have changeable detail added on an overprinting-machine. For users who do not wish finished labels to bear perforation, these machines may be equipped with a cutting attachment.

In addition to the more conventional gummed variety, Tickopres self-service labels are available with all kinds of adhesive backing adopted for refrigerated dairy departments.

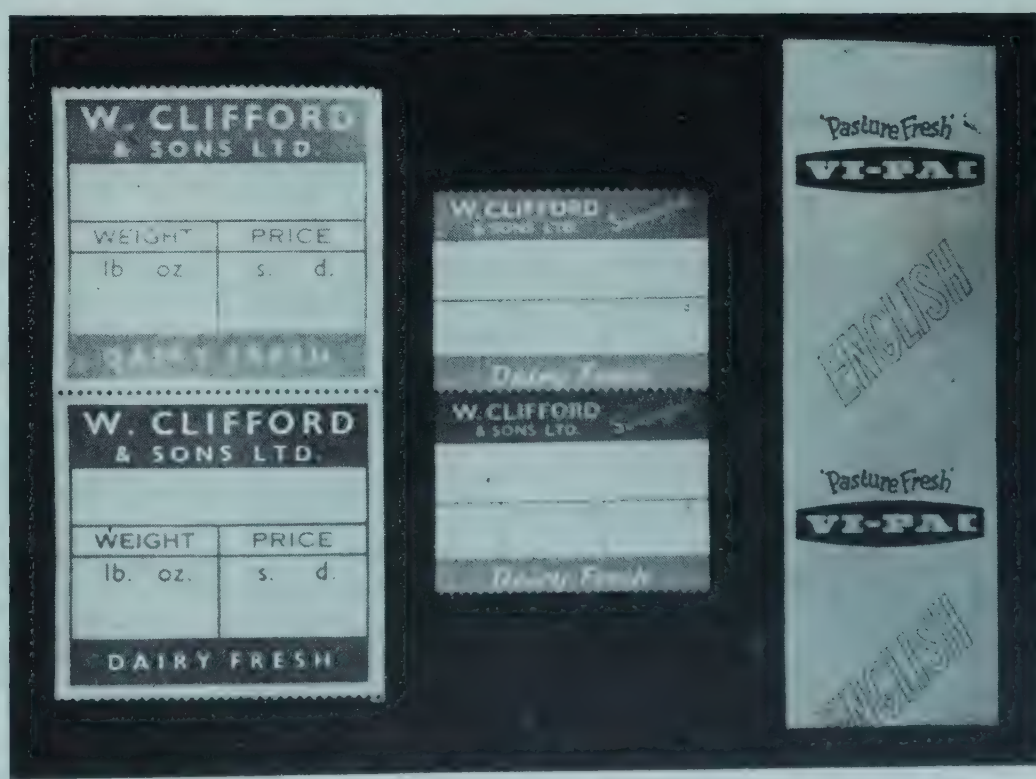
Self-adhesive and pressure-sensitive labels in the Tickopres range permit a label to be affixed simply by finger-pressure. It can be peeled off at will.

Especially for those products whose nature bears the moistening of labels by water, heatseal labels such as the Tickoglos are eminently suitable. Applied by heat and slight pressure, either by hand or by heatsealing machinery, they allow labelling to be fast, clean—for there are no gum-smears or fingermarks—and wrinkle-free.

Where it is undesirable to bring heat into contact with a dairy product, delayed action heatseal labels are used. Drawn through a small activator such as the Tickotherm, these remain 'tacky' for several minutes after removal from the heat-source.



This illustrates the sizes in which self-adhesive or pressure-sensitive labels are available; they may be obtained in colours for coding batches of products and in large split-back label sizes for product, bottle and carton label purposes. They may be applied by machine or hand methods and adhere merely by light pressure; they peel off without leaving any residue behind on the surface to which they have been applied.



Examples of labels similar to that produced on the Tickopres machine. They have an application in pricing and marking cut joints, freshly wrapped food products, and other items.



The new international air freight merchandise carrying labels which are now affixed to fragile glass, perishable and similar types of foods and beverage products when packed for overseas trading. Their use and application has now become universal and their message is fully understood by all handling cargoes of goods from every country.

As the adhesive backing is unaffected by moisture, these heatseal labels can be inserted actually inside packs. In planning the Tickopres dairy labels, care has been taken to select papers, inks and adhesives not injurious should they come in contact with the product. The self-adhesive Tickostik label, for example, has been examined by a public analyst who reported that it conformed with the various specified conditions of the Food and Drug Acts.

Labels for Air Freight

The very rapid growth of air-lifted commercial merchandise which often includes certain types of foodstuffs and beverages in transit for export, did at one time, raise all manner of problems concerned with the packing, wrapping, packing cases and forms of labelling to be adopted in order to avoid delays in the arrival of consignments and safety of produce in transit. The labels used were varied and printed in an assortment of languages which were not always understood by the handlers at the point of landing. Labels too often did not signify the contents of the packed consignment. Today, there are recommendations which must be borne in mind both from the packer's point of view and by airport and airline authorities for the safe handling of all kinds of freights, however fragile, perishable or otherwise liable to damage in transit through careless handling.

New IATA merchandise labels, specially designed for labelling and marking certain types of merchandise, have been recently introduced and examples are produced for the interests of packers dealing with perishable and fragile merchandise packed for air freight for transit overseas. Labels of this kind assist in a common language and remove any barrier of misunderstanding concerning the labelling of goods and their contents. These new designs are of an international character which simplifies the work at airports and other points of embarkation and disembarkation. Two

new symbols have now been designed to replace the international air cargo handling signs for the term 'Fragile' and 'This side up.' In the place of a cracked wine glass, which formerly called attention to fragile goods, the cracked glass now becomes a broken one calling attention quite clearly, to glass produce packed in a case. The 'Correct way up' or 'This side up' is indicated by two upward pointed arrows above a horizontal bar. This again replaces former signs on labels. Such universal labels in picture style do emphasize that a picture is worth a thousand words. The label for 'Perishable Goods' has also been altered somewhat, the new illustrations being a carcass of beef, a bunch of grapes, a fish surrounding an hour glass with the sands running out. This indicates that time is not always on the side of even the fastest travel and such labels should be used where delicate, perishable and similar products are being packed for air freight. These labels are printed in specified colours in size 6 in. by 4 in. Carrier's name is shown. These are additional to the label used normally for addressing goods to their destination so that they serve solely as warning labels relative to packed contents.

Labels for Composite Containers

Various kinds of base papers are used for this form of labelling among which are paper and foil based materials. Most of these labels are treated after printing to some form of lacquer such as varnish or cellulose to afford durability in handling and first class appeal to the finished product. Spiral labelling is a special operation wherein the printed label is wound on the outside of the container or tube. In the main, spiral labels are applied by what is termed the registered spiral labelling process so that the applied label has every appearance of the printed or wrapped container. This form of labelling has in the main an application where food and allied products are mass produced and large quantities of containers have to be labelled.



Examples of well-printed wine labels and first class label design.

Label Design Progress

Here are some extracts from recent Bulletins issued by The Labologists Society:

'Lager's New Label. Dortmund Lager has been given a new look. The bottled product is now being labelled with the Dortmund Breweries' own famous label which is used in all their big export markets. The new body label, white background edged with red and gilt, is overprinted with the breweries' "U" trade-mark in gilt and brown and its name in red and brown. There is an attractive neck label to match.

'Joule's Label "Face Lift." Joule's of Stone have changed the labels on their bottled beers. The new labels are much more readable, and are of pleasing design and colours. They retain the significant Joule's red cross and are colour coded as follows:

Pale Blue Label — Joule's Stone Ale

Green Label — Joule's Special Bitter

Biscuit Label — Joule's Brown Mild Ale.

"Red Seal" Cyprus Sherry by Cyprus Fruit Sales (London) Ltd., have new labels, oblong in shape they bear a red seal and the type of wine in white letters on a black band, the body colour varying, being gold, light green, blue and grey for Golden Cream, Pale Dry, Medium and Commandaria respectively.

'The Labels of R. White's soft drinks have been re-designed. The dog-toothing and strip shading of the labels accentuates the lines of the bottle and throw into prominent relief the brand and the product names, particularly the former, which is printed in white Roman capitals on a dark blue panel. The other colours used on the labels vary



Above are examples of commemorative bottle labels and on the right is shown the superior presentation of Deinhard wine bottle labels giving the story of the vineyard and of the owner.



as appropriate to the contents. The label is being adapted for R. White's Split size bottle.

'Guinness Bicentenary Label. The business of the St. James Gate Brewery in Dublin was founded in the year 1759 by Arthur Guinness, though the site had even then been occupied by a brewery for a considerable period. To mark the bicentenary a new label is being issued for use in Great Britain. Biscuit-coloured, it bears the "harp" trade mark and the inscription "1759-1959", together with the words "Guinness" in red and "Extra Stout" in black letters.

'Labels from Johannesburg. South African Breweries, Ltd., of Johannesburg, who produce the "Castle" beers, have issued new labels for the Castle Premium Lager and their Lion Export Ale. The "Castle" label was designed locally, and has blue lettering on a gold ground, while the "Lion" label is darker with a red panel. Each has a matching neck label.

'German Wine Labels. A German wine label may sometimes appear to be somewhat complicated, but in reality it offers far more information about the wine to which it refers than most other wine labels and with a little knowledge the information it contains can be easily interpreted.

'As an example let us take the following wine name: Rudesheimer Schlossberg Riesling Trockenbeeren Auslese and break it down into its component parts. Rudesheimer is the possessive form of the name of the town of Rudesheim. The first word of a German wine is almost invariably the

name of the town or village around which the wine has grown. Schlossberg is the name of the actual vineyard in which the wine is grown, meaning in this case "Castle Hill". Riesling is the name of the type of wine or grape from which the wine is made.

'There may then follow one of a variety of words, indicating the method by which the grapes are harvested. Spatlese—means late gathering. Auslese—gathering of selected bunches. Beeren-Auslese—gathering of selected berries.

'In the case under consideration: Trocken-Beeren Auslese—gathering of selected grapes which have been allowed to remain on the vine until they are almost dried up and raisin-like.

'The following terms are also found on certain German wine labels, particularly in Germany:—

Wachstum, meaning "growth". This is always followed by Gewachs, the name of the vineyard proprietor.

Original-Abfüllung Keller-Abzug Schloss-Abzug, meaning "original bottling" by the grower in his cellar.

'A peculiarity of German wine production is that the actual vineyards are often sub-divided into relatively small areas under different ownership. There can, therefore, sometimes be quite considerable differences in both quality and price between wines which bear the same district and vineyard names. Hence the shipper's name assumes considerable importance as a guarantee of quality and continuity.'

CHAPTER 12

Seasonal Packs, Novelty Ideas, Product Visibility, After-use Containers, Carry Home Packs, etc. Trade Exhibitions, Progress Reports

Seasonal Packaging

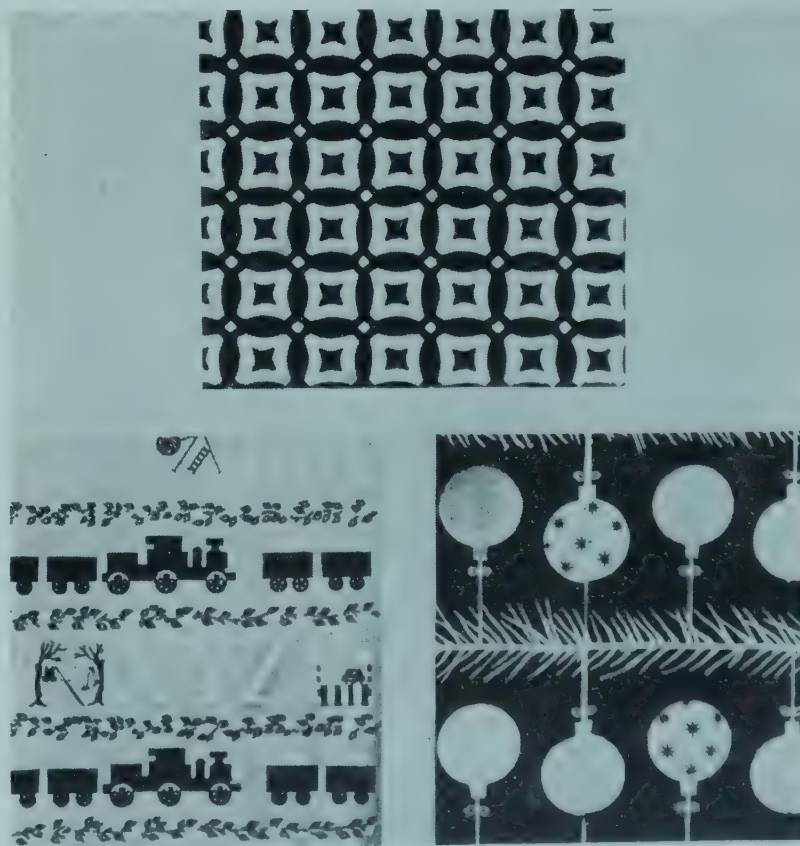
IN the earliest days of packaging development the most important progress was undoubtedly made in the sphere of Christmas and Easter product presentation. This involved fancy printed papers with traditional designs, e.g. holly, Father Christmas motif, coaches and other similar features which were incorporated in a printed design packaging wrapping or printed carton. For Easter packages, the egg and the chick were among some of the popular motifs, but today seasonal packaging has gone far beyond these bounds, and if the home producer is to keep pace with overseas countries and their now established methods of product presentation, one now has to include novelty, visibility, the possible after-use of the container, facility of opening the carton and extracting the contents as required, in addition to the special occasion and gift presentation forms of packaging. The carry home container which acts as a display piece in the retail store and shop window is a convenient form of presentation and is also among recent food and beverage packaging developments.

The packaging experts pay considerable attention to the lure of the pack and recently a very remarkable package evaluating machine has been designed. Known as 'Clade' (the colour, light and density evaluator) this machine enables package designers to carry out their work more quickly and with fewer headaches than hitherto. At the same time, the manufacturer himself or his packager is enabled to gauge how his products will appear when displayed with those of his competitors on the shop shelf and under a variety of lighting conditions. This machine reproduces all such conditions, creates the illusion of viewing from various distances and enables visibility to be assessed.

Lighting plays an important part in the display of colourful products and this is one of the important aspects of current display which must be considered at the onset of package designing. There are some six different forms of lighting—tungsten, fluorescent, natural, colour matching, warm white, and warm white de luxe—and these various forms of lighting, it is claimed, may be selected by 'Clade' to illuminate the pack or contents of a container and this is all visible through an eye-level aperture. Visibility in the

shop window can be reduced by misting due to water condensation, thus making package identification rather difficult. To reproduce these conditions, 'Clade' was equipped to create slight or dense misting effects, as well as the amber colour imparted to displayed products by plastic sunblinds in shop and store windows.

Seasonal packaging is amply aided by a vast range of fancy printed wrappings. The designer produces first class individual designs often incorporating the packager's trade mark or emblem. Any number of colours may be incorporated in the wrapping and the designs available are almost limitless. Seasonal packaging papers carry designs



Some rather novel printed patterns with seasonal motifs which have an application to parties, children and the festive season. The printed and embossed fancy wrappings may be used as box and carton covering material and are suitable for fancy food products popular at the seasonal times of the year.



Some current examples of stem ginger packaging, the container making a special appeal as a gift purchase. Here, first class colourful labelling, novel unit container style and presentation are the considerations. Such packaged products display well and make an immediate appeal at the right time of the year.

suitable for children's packs, teenager's and for the adult members of the family. These all have a bearing on the season. In addition to wrappings and specially printed cartons, there are seals, tie-on tags, greeting labels, any of which may be used in conjunction with a seasonal wrapping or with a plain packaged product. Seasonal packaging often includes novelty of package design or shape in addition to fancy wrappings and where the product has a seasonal flavour, this form of packaging helps to both display and sell it.

The range of products which can be wrapped in seasonal attire is very wide, and more and more food and beverage products are being housed in some kind of container or jacket with a seasonal flavour with a view to creating shopper gift choice.

Under the heading of seasonal packaging may be included gift and special occasion wrappings and this is fully dealt with in other chapters. The important fact is that more and more attention is being focused upon the aspect of special occasion packaging and this is a trend which has come to stay.

Novelty Packaging

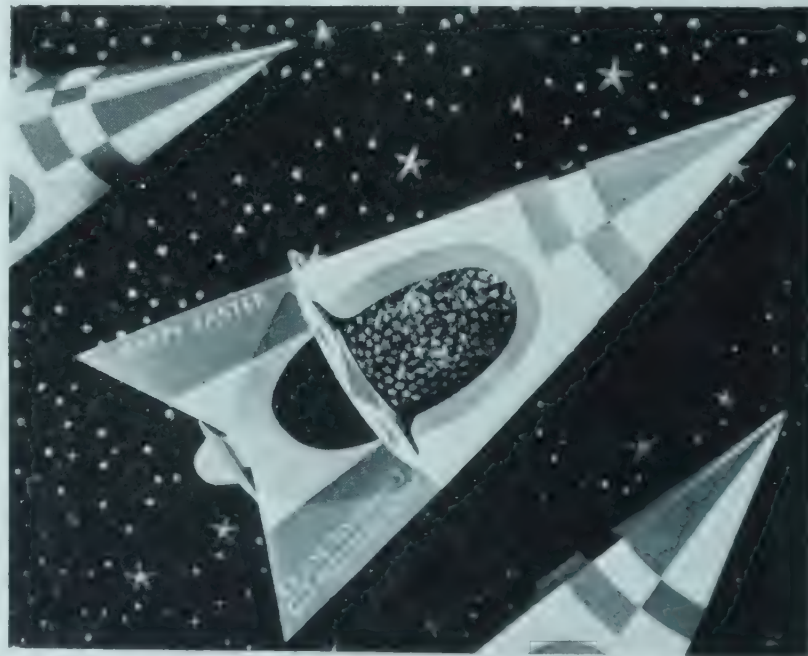
In Chapter 7 some novelty ideas just received from continental countries are surveyed. This trend is gaining favour at home where some kind of novel presentation may be combined with utility, visibility of product and eye appeal. Novelty always seems to intrigue the shopper in the search for something new for a gift purchase. Many kinds of food and beverage products lend themselves to novel forms of packaging and the subject may be carefully analysed by the specialist if advice is sought.

Product Visibility

Products of all kinds are now being presented in some form of visible packaging material and among the several mediums used to achieve this aim is some suitable type of

cellulose film. There are many kinds of plastic bags used, for example, to package vegetables. It is claimed that the sales of such products have risen from some 100,000 packs in 1954 to well over 300 million since the last calculation was made. Well over half of this total is packed potatoes. The housewife demands high quality produce, clean and farm fresh, selected and graded in a convenient weight for the flat and where a brand name becomes known, such a quality is in constant demand. The illustration shows a potato pack of Diothene polythene film, printed in multi-colour, the material being formed into bags by the Metal Box Co. The bags are now being made of shock resistant Diothene film specially developed to bear the stresses and strain of handling and conveying. This material is also claimed to be very strong and with great strength; it costs rather less than the gauge of film previously employed for this purpose. (See page 216).

The impact of plastics packaging is being felt in more and more new fields of usage and it has now reached the break-fast table. Printed pouches of Metalthene polythene coated cellulose films produced for vacuum packaged bacon and for caterers' coffee are becoming popular forms of produce presentation. This material has exceptional bond strength, an important factor in the packaging of bacon. The coffee in this case is not vacuum packaged, but the low gas transmission rate of Metalthene makes it specially suitable, and the coffee reaches the caterer in roaster fresh condition. In both packs the print is 'locked-in' between the cellulose film and the polythene giving them a very attractive high gloss finish. Farm-yard eggs are now most attractively packaged in some form of visible carton. The 'Lioba' Ovit egg pack affords full protection for the eggs at the lowest possible cost with first class display facilities. The presentation is well designed and printed and permits of examination while the goods are on display. There is also a similar carton for fruits and the 'Topfix' fruit prepack is one of



This is an Easter Rocket, a package which breaks away from the established traditional chocolate egg pack design. Printed in three colours, this modern pack makes an immediate appeal to the buying public of all ages.



For sheer novelty and product visibility, the new 'Netlon' plastic packaging net has much to commend itself to packagers of high class fruit and vegetable products. This continuously extruded thermoplastic tubular net is available in suitable forms for the prepackaging of choice fruits and fresh graded and cleaned vegetables. Weight for weight, and purpose for purpose, the new 'Netlon' is claimed to be about 10 per cent cheaper than polythene bag packaging. The product is fully visible and may be examined at the point of sale or display in the store.



Novelty styled containers suitable for liquids and powders and now used as dispensers where small quantities are needed. While these have an application in the fine chemical industries, they could have a use in the packaging of mustards and other table products where specific quantities are used for the table or cooking. These colourful and choice containers incorporate caps, plugs, sprays, and other facilities. Squeeze, spray and puff are the features of these containers which have an after-use appeal in the home. There is no end to the adaptation of this type of container which is becoming more and more popular among the discriminating purchaser.



This may best be described as punching 'Perrier' at the point of sale. The recent activities of W. M. de Majo have been concerned with the launching of a French beverage in this country and the advancement, at the point of sale, with a line of wines produced by W. & A. Gilbey Ltd. The French product is 'Perrier' water from the famous springs of Provence and Gilbeys are the sole importers and distributors of this product at home. This pack is attractive and colourful and is bound to make an appeal to the consumer in search of a novel presentation.



Chocolate Drops from A to Z. Cadbury's new pack designed for gift purposes.



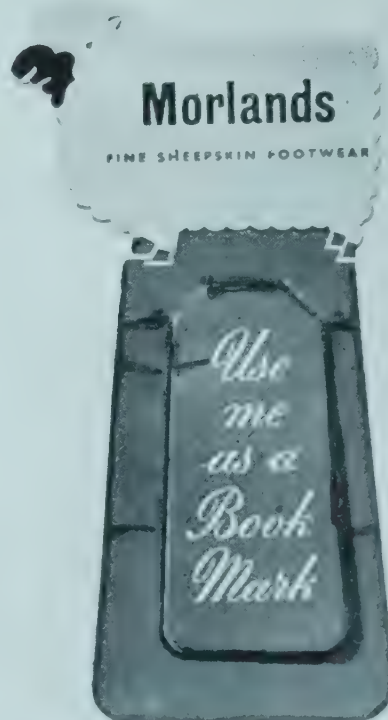
Novelty Easter Egg packaging. This Nestlé package is constructed to provide considerable strength and protection for the egg which is one of the more important features of this kind of packaging. The novelty carton is printed in six colours photo offset and makes a first class display piece.



A novel pourer for nut and fruit dragees—bright and colourful and very convenient. The pourer at one end of the carton allows an opening to be made, the pourer jamming at a predetermined point to avoid spilling the contents. This is a letterpress printed design in four colours, the illustration fully outlining the contents of the carton.



Another seasonal and novel package for small eggs, designed to hold three eggs securely in position providing the maximum rigidity and protection. The surface design has been well planned to present a background for the eggs so that they appear to be nestling in a mass of colourful spring flowers. This carton is lithographed photo offset in five colours.



Another form of novelty which may be incorporated into some form of guarantee tie-on tag for suitable high class products. In this case, the tag may be used as a book mark after it has been removed from the package. It helps to remind the consumer of the brand long after the goods themselves have been used.

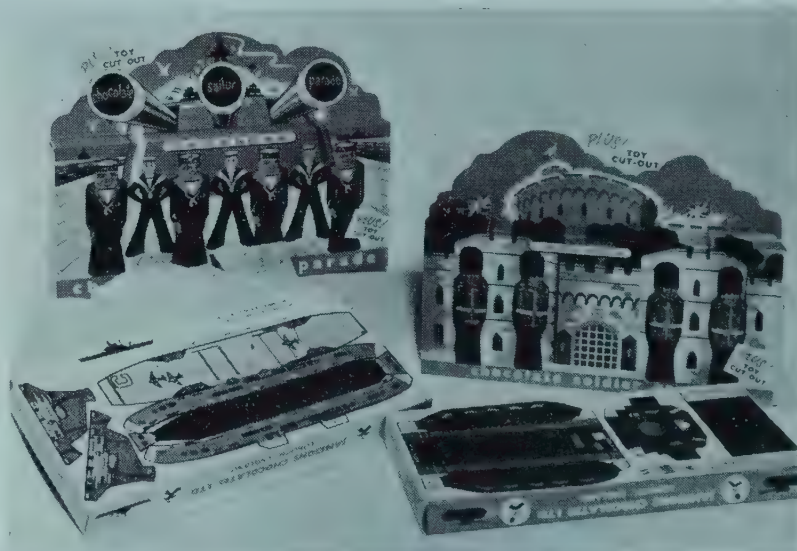
The novel and visible presentation of fruit or confectionery in a fancy package made up from viscose film with supporting foliage and protective cartoning material. Contents are fully protected and visible and make a choice display piece.



An entirely new two-piece collapsible box providing strength and rigidity equal to a hand made box. There are some objections to the present flanged collapsible two-piece box, one being that there is a distinct tendency for the side and end walls to bow when the box is made up. Furthermore, the flanges fitted at top and bottom prevent an overall design being used to complete satisfaction. The box has also been criticized on the ground that it does not always have the feel and appearance of a truly rigid box. This new two-piece box, developed by William W. Cleland (the subject of a patent application) overcomes these important objections and provides a completely rigid box which does not whip or feel soft in handling. The flanges at top and bottom are integral with the body, and the method of construction is such that the walls cannot bow outwards when assembled. Thus complete rigidity is obtained by reinforcing the lid and base with fitted strawboard. The upper flange is padded and domed. The construction allows a printed design to be carried over from the lid on to the side and end walls. The lower of the two illustrations shows how the components are delivered. It will be seen that when the side and end walls are pulled up there can be no tendency for them to bow outwards. It is claimed that the assembly is quicker than with the normal collapsible flanged box and both components are completely secure when erected. This positive assembly is obtained by specially treated surfaces meeting and bonding so that once assembled the box cannot be collapsed without mutilating it. The finished box is reproduced by photo litho offset in eight colours and is most attractive.



Novelty containers made by John Waddington for the confectionery trade. These thermo-formed plastics are made in the shape of a toffee boat which serves as a raft after the contents have been eaten. The 'Kay-Kay' drum combines gaily printed board and thermo-formed plastic for the heads. There is added sales appeal provided by the transparent window which amply shows off the contents. Such types of containers can have an application in the biscuit, cake and other food packaging fields.



The Jamesons' Chocolate Soldier Parade in the form of a castle printed in four colours by offset litho process of printing. It contains four chocolate soldiers in a tray carrying a picture of a tank. At the reverse side of the carton which is made up of continental bleached folding box board, is a kit for a model tank. This carton is made and printed by the Metal Box Co., and makes an ideal display and novel piece for the shop window. Jamesons' also sell four chocolate sailors in a special carton printed in four colours litho. The cut-out at the back in this instance may be made up into an aircraft carrier and the front and the tray itself inside the the carton both have three sailors printed on them. They are made by the same house in similar material.

One of many new novelties in the confectionery packaging field and in this pack sweet candy oranges are choicely displayed and suitably filmic protected in a wooden chip crate appropriately printed in the usual style. A novel pack with an appeal to the younger folks.



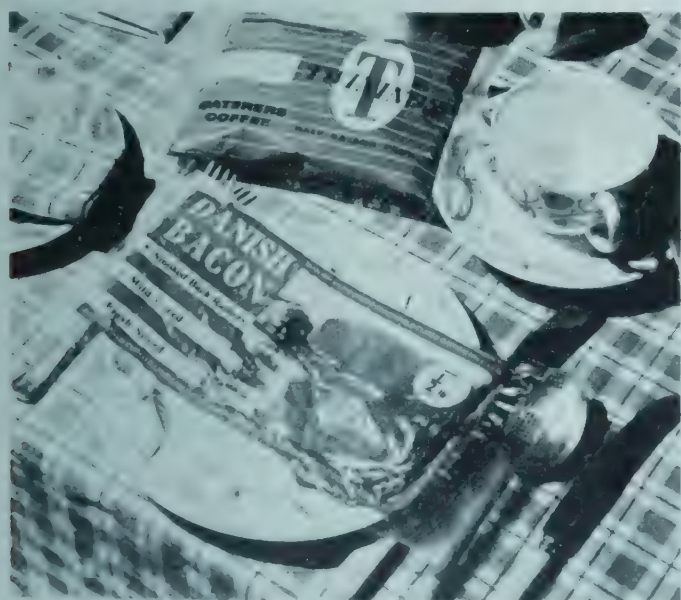
The now popular miniature sized wine, spirit and liqueur bottles which are faithful representations of their bigger editions. They are sought and collected by many and have become part of the display scene in many stores, off-licences and public houses. They make an ideal gift souvenir and stimulate and develop the collector instinct which is latent in many people.



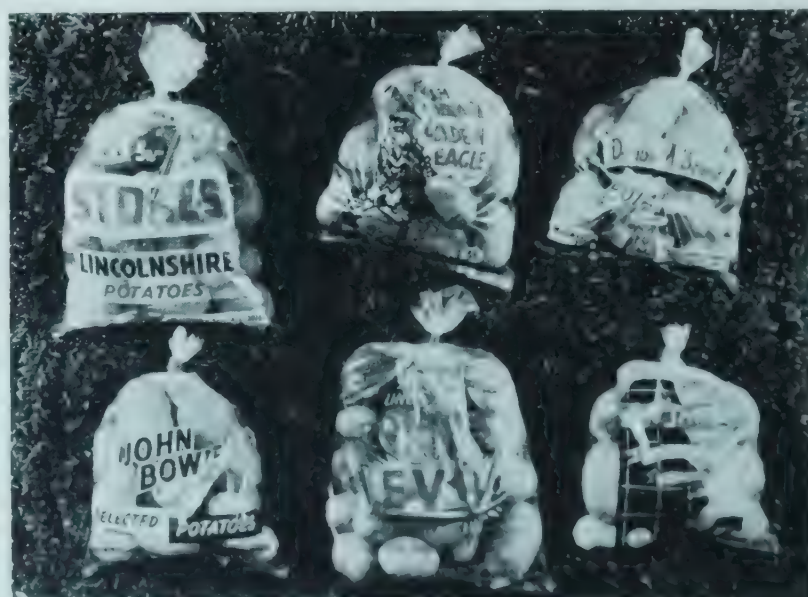
several now becoming popular features of the display and presentation. This pack is formed from one piece of board on a simple machine which may be hired by the packager at a nominal cost. Clarifoil is yet another transparent semi-rigid material now used for the make up of visible containers of many kinds which have an application in the food and allied trades.

This form of presentation is a definite display aid and the lid of the carton protects the contents when purchased and

placed in the shopping basket. There can be no doubt, that the visible presentation of the food product is growing in size and importance and just recently, the United Glass organization stated that they are forming a subsidiary to be named United Glass (Thermoplastic) Ltd., with a view to making blown and moulded plastics containers and associated injection mouldings. These new products, it is stated, will be complementary to, rather than in competition with, glass containers.



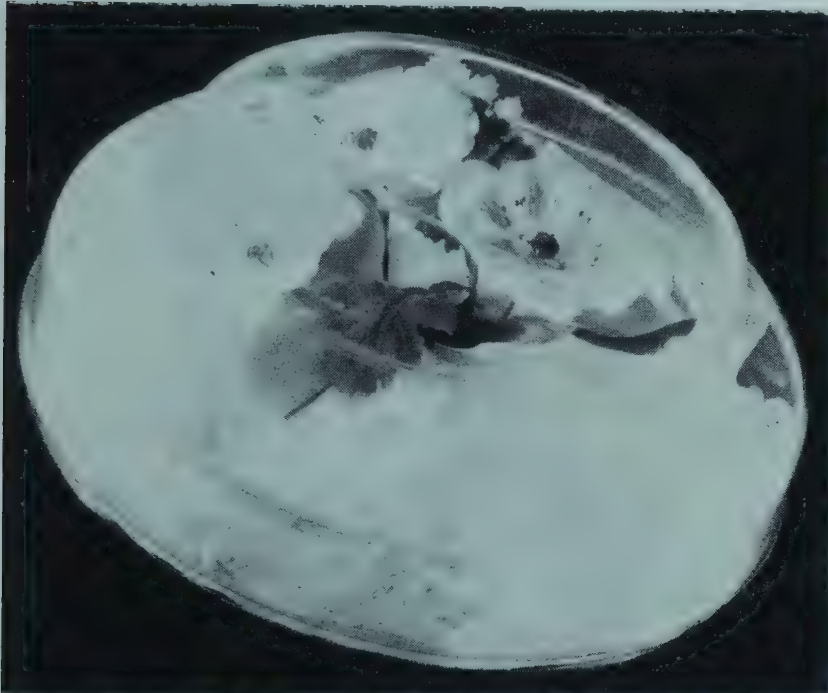
Metalthene pouches for coffee and bacon.



Potato bags of Diothene polythene film.



Above: The Ovit egg pack and (right) the Topfix fruit prepack.



Clarifoil acetate film container with floral decoration enclosed.



Grape box incorporating a Clarifoil window.

After-use Containers

Illustrated in this chapter is the chocolate composite container and this has a very definite after use as a pencil box, a container for knitting needles and similar items when the initial contents of the box are expended. There is no need to enlarge on what has already been said relative to the merits of this form of container. They make ideal gifts and novel packs and where the container may be used after the goods have been eaten, the name and brand are long remembered with advantage to the manufacturer.

Honey and stem ginger jars are first class examples of containers where the empty vessel may be used for many other purposes, not the least, a flower vase. A transfer or some colourful form of label, helps to engrave the name of the product or the brand into the minds of the household. In Chapter 7 surveying current overseas packs, other ideas are shown which emphasize a distinct trend towards this useful type of unit production container. The glass container which may be used as a sugar sifter is yet another example of after-use and such ideas were popular before the war. G. W. Horner pack their well-known toffees in a



Attractive confectionery after-use container as tobacco jar.

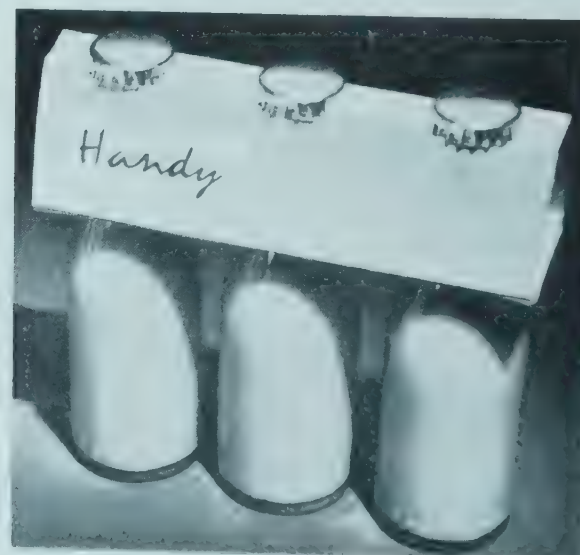


A metal box which may be used when empty as a glove or handkerchief box or a container for odds and ends.

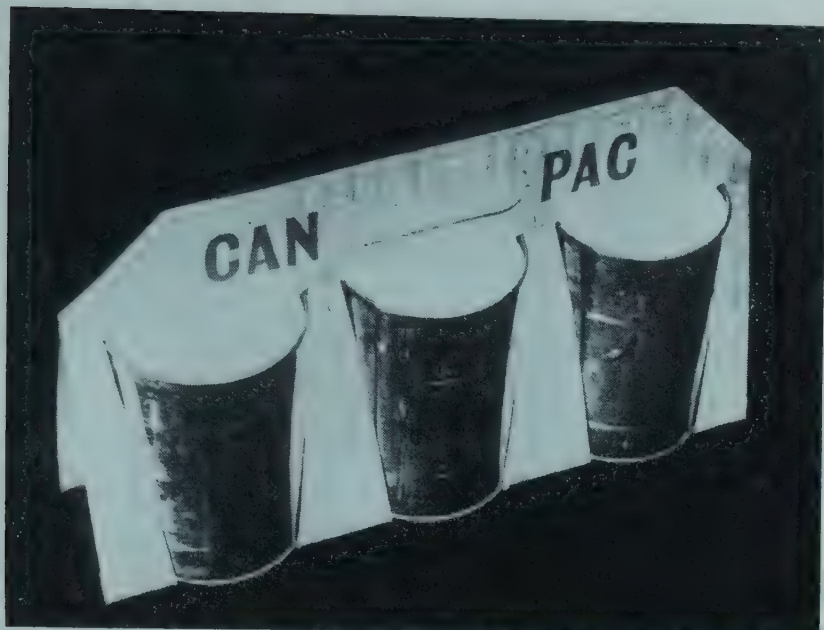
very attractive tin which is well made and printed in six colours on a white base by the Metal Box Co. It has been specially designed to serve the use as a tobacco jar or cigar box after it has been emptied.

Carry Home Packs

One of the most popular display carry-away containers is the Britvic open and window type carry-away units. Choicely designed, made up and printed they display the product to full advantage. They are a convenient form of display unit for the retailer and where a specified number of bottles of beverages are purchased, they may be suitably carried away in safety and conveniently by the shopper.



Some examples of carry-home containers are illustrated above.



Presentation and carry-away pack for tins of foodstuff.

This idea is very popular on the continent where packs of six bottles are a good average unit size. The white lined board used is very tough and strong with a good white and clean surface which may be printed in colour.

There are other visible types of bottle carriers and these are amply illustrated in this chapter.

A recent example of first class beverage display unit is the Clayton Ginger Ale point-of-sale display unit. This is a three-dimensional unit designed by W. de Majo and holds any one of the Clayton's baby or split size mineral bottles. It is designed for the counter, the shelf or for window display and it packs flat for transport. It is quickly erected by moving the main rear strut into the right angle position, automatically pushing forward the two cut out hands. The background is in 'Clayton Green' with white lettering and the platform base is in primrose. The stylised hands and glass are in primrose yellow, brown, pink, black and white.

Jelly Babies in a new carton is a Bassett's product which needs no introduction. The makers are not content to rest on their laurels but are now launching a new colourful pack which was designed, printed and made by The Metal Box Co. The box is of an unusual shape for a cardboard container; it is, in fact, square with four chamfered edges. It is printed with the brand name and differently coloured jelly babies on a dark purple background, while the top of the lid and the chamfers are printed with a vari-coloured lozenge design. This pack is formed from a flat sheet and with specially designed flaps to make up a firm container, the pack is made to hold 12 oz. of jelly babies.

The new Chef soups mix is put up in a laminated material. A number of these popular soups are being packaged in Tripolam made and printed by the plastics group of The Metal Box Co. This material is a combination of two plies of aluminium foil with a single web of paper, plus an inner, heatsealing coating. This tried and tested lamination provides a strong and moistureproof pack for the soup. The outer foil is printed with the brand name, the name of the soup and all the necessary directions for making up



The new Kappak display packaging unit.



Clayton's Ginger Ale point-of-sales display.



Bassett's new carton for Jelly Babies.



Chef soups in laminated packs.

soup recipes. The printing in full colour is carried out on a striking blue background.

The new Seagers wine gift pack is despatched in perfectly rectangular shape and one end panel is pulled away so that it may be opened out to form four separate compartments, each of them containing two miniature sized bottles. This is a very attractive pack with considerable display value and it is overall illustrated with various vineyard and wine garden motifs, the factual scenes being printed litho in four colours and varnished to further enhance the printer's art. It was designed by William Cleland.

Diotite—An Advance in Cartoning Work

The use and application of this important carton making material is illustrated in the Fropax black currant package which is well designed, printed and produced for packaging in conjunction with the packaging of frozen foods. This is a new material of considerable importance to packers of frozen foodstuffs. It is a printed, heatsealed, high gloss waxed carton which does away with the necessity for an over-wrap and which is complete in itself. It is of outstanding efficiency, convenient, and inexpensive, needing only one set of machinery. These cartons are delivered flat for automatic erection, filling and closing on machines designed and built by the Metal Box Co. The whole system, covered by patent applications in many countries overseas, was developed after prolonged research and experiment and the first Diotite cartons, which contain Fropax food products, are now appearing on the market. These cartons are printed in full colour and with their heat sealed flaps are of exceptionally neat appearance. They have an application for other food products packaged on similar



Seagers new wine gift pack.



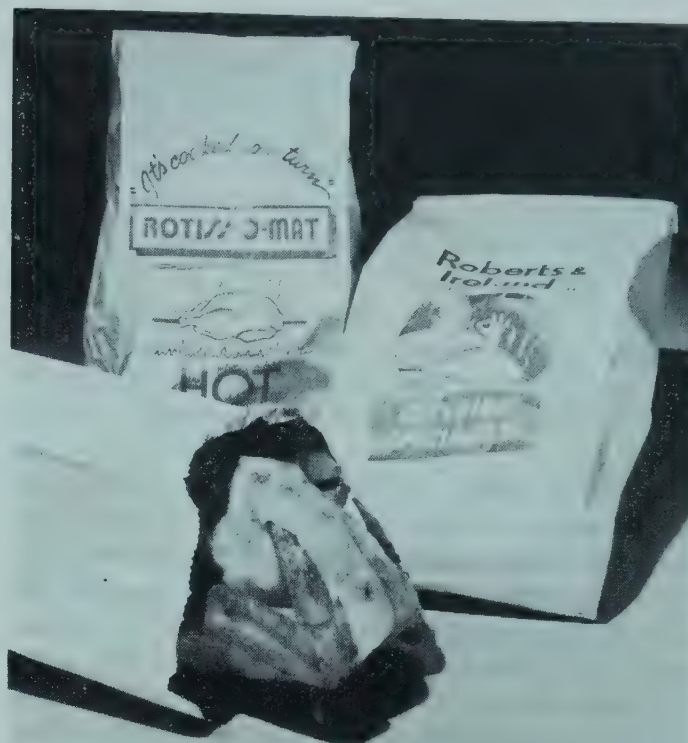
The Nestlé assorted milk chocolate Buchettes pack which is produced from first class folding box board printed litho offset in six colours and gold. The printed surface has been treated with a double varnish application to further enrich the printing and render the pack finger- and dust-proof. Basically, it is a shell and slide construction, but the shell is so designed that it provides flanges in order to give a much more elegant appearance to the finished pack. This is another William Cleland construction.



The Wrappak is designed to hold chocolate bars, chocolate wafers and biscuits. An ideal display piece and of convenient size for the shopping bag, pocket or handbag. This is what may be termed the theatre pack.



Diotite is used for the packaging of Fropax blackcurrants. Right: Barbecued chickens in laminated foil bags.



The new multiple carton known as the Carrycan.

lines. This is a revolutionary system which involves many technical considerations as compared with ordinary cartoning and it awaits further development.

Poultry packaging in all its forms has reached a high peak of perfection and many new types of films, laminates, waxed foils, etc., have been introduced for the packaging of both cooked and uncooked farm produced poultry. Bags made from paper and aluminium foil laminated together for the purpose of enclosing hot, barbecued chicken, just taken off the spit, are now used, the bag being ready for carrying away or for despatch. The bag has an inner foil which is grease-resistant, so that the chicken can be carried away in perfect safety. It also retains the heat for an hour or two, so that re-heating is not necessary if the chicken is eaten as soon as it is unpackaged. The outer paper supports the foil and may be printed with a brand name or with any necessary instructions.

Multiple packaging may be described as the key to future sales.

The Carrycan is only one of four kinds made by the Metal Box Co. Each type is produced in several sizes to take varying numbers of unit shapes of can. In some



Two more beverage cans of tone and quality. The first of these by Metal Box Co., is made for Whiteways Export Cyder and is a 16 oz. can printed in four colours by the lithographic process and also incorporates a gold lacquer. The partner in the picture is a can made for Younger of Alloa Sweetheart Stout and is a most attractively printed can, a coloured photograph having been used to decorate the container. Made and printed in four bright colours on a white base, this is a new departure as most beer cans are at present printed with designs based on line drawings. These cans are made of tinfoil and are both printed by the litho process in the flat sheet before being formed into cans or containers. There can be no doubt that the beverage trade will develop the use of the printed can with its several advantages, not the least, returned empties and breakages.

varieties of case making some are made to be packed by machine processes while others are packed by hand. These cartons offer considerable scope to the designer for striking decoration in colour, sales messages or slogans, trade and brand marks. Of those shown, the Waveney packs are printed in red and black, while the Charrington pack is in green and black and the special offer pack is in cream and dark blue.

British Celanese are responsible for some outstanding beverage packs based on their materials and one of the outstanding designs of the year is the .0008 in. clear transparent Clarifoil acetate film which has been laminated to printed board, giving the final container make-up a very high gloss finish. The 'Black and White' carton is an example. It is most attractively produced and is of the kind which displays well and makes an ideal gift pack. Good designing coupled with this new treatment can produce some first class cartons and packaging cases.

Fruits and vegetables are also being housed in new types of material and the tendency towards packed contents visibility with some convenience or novelty is often incorporated with the pack.

More and more brands of beverages are being packaged in cans and another brand among the latest arrivals in the shops and stores is the Ben Shaws sparkling Suncharm Fresh Orange drink. The printed can is very striking and appears to be receiving considerable attention in the West Riding of Yorkshire and South Lancashire (territories marked out for initial delivery) but it is hoped that the area of supply will soon be extended to other parts of the country. The 12 oz. can which will fill two average sized glasses, retails at 10d. per can.



A composite container with a gay design.

Transparent Clarifoil is used for this whisky pack.



Selected and graded tomatoes in bags made from Bexthene film extruded from Bakelite polythene.

In addition to novelty, pack visibility and after-use appeal, there have been some other important trends in the field of food and beverage packaging which have come to the fore in recent months. At the conclusion of the various chapters, where some important new innovation is contemplated, it has been included under the heading of progress. Among current developments are vacuum forming and blister packaging which can have certain applications in the food and allied trades, the vacuum packaging of non-rigid containers of various kinds, the radiation preservation of foods and the increased application of films, tinplate, and polythene containers which dispense limited quantities of contents as and when required. New types of screw caps and corks, dispensers, aluminium tubes are some of the other developments which have been surveyed in the various chapters and the packager should take into account such factors where novelty, facility, visibility and convenience of package is under consideration.

Oscars for Point-of-Sale Packaging

In addition to the periodical awards presented to British packagers as a result of competitions organized at home, Oscars have been awarded recently to them in overseas exhibitions. The 1959 Packaging and Point-of-Sale Advertising Exhibition held in Paris created a considerable interest and drew many visitors from other countries. Common Market countries other than France were also represented among some 450 exhibitors of products and packaging ideas. The French Packaging Institute (Institut Français de l'Emballage et du Conditionnement) awarded prizes for outstanding exhibits, in the field of packaging. The jury, consisting of professional packaging experts, independent specialists, and other prominent figures in industry, granted 32 awards from among some 100 entrants. A polystyrene high-relief counter display unit for Air-Wick, the household deodorant in aerosol form, by Plastivac was one winner, another was a serve-yourself counter display for Rex, a dish washing product launched in France early this year (1959) and the Edgelit colour changer known in France as the Rotosign. Sixteen exhibitors were selected for other awards.

Home and international interest in all forms of product presentation which includes packaging, sealing and labelling continues to grow and encourages the designer to produce even more attractive methods based on new materials. Those concerned with packaging the product may learn much from a visit to the trade show or exhibition.

On the home front, some interesting packaging ideas have been shown at the recent International Packaging Exhibition held in London at Olympia. Leading packaging specialist organizations have made outstanding contributions towards better packing and packaging in all its forms. John Waddington, for example, have made considerable progress with equipment for automatic production of thermo-formed plastic containers and closures which have an application in the beverage trade. A recent introduction is a rectangular stepped-wall container, with radiused corners and a welded-on lid, suitable for the purpose of packaging liquids yet with its walls attenuated by plug-assistance forming to a thickness of only 12 thou. This container is being used by Kia-Ora for a half pint orange drink and employs a new type of closure. Closing thermo-formed containers in such a way that the consumer may gain access to the contents is not by any means an easy task, but the solution found for the Kia-Ora product may be described as an ingenious example of progress. A shallow flanged dish-like lid is heatsealed in place. This lid has a small central depression sealed by an integral membrane so thin that it may be pierced quite easily by an ordinary waxed straw paper, the end of the straw being merely cut slant-wise to provide a much sharper point. The depression, although quite small, protects the delicate membrane during the period of handling and stacking. Sealing machines suitable for containers of this type have been formulated in conjunction with the soft drinks manufacturers.

Vacuum-packed Lobsters

The French packager pays considerable attention to the packaging of fish products and a new marketing system now used by the French lobster fisheries in order to prevent loss of weight always experienced with fresh caught lobsters has been introduced. Lobsters are now being vacuum packed in Rilsan polyamide film (the British trade name of which is Ralsin) and this is used on board fishing vessels and sent directly from the quayside to the deep freezers. This new method is claimed to have eliminated loss of weight brought about by freeze dehydration by some 7 to 8 per cent. This process is being studied by the British fish packager.

Compartment Food Cans

This is another important Italian food packaging development which is worthy of consideration by packagers at home. Cylindrical tinplate cans which are made to incorporate a polypropylene bag, the mouth of which is trapped in the end seams, in order to contain—as an example—the specially made up sauces used in conjunction with various pasta products, has been introduced in Italy, the latter being kept separate from the sauce itself up to the point of serving.

A synthetic resin lacquer is applied to the interior of the can itself, which after filling and sealing, can be effectively heat-sterilized. Some current examples now marketed incorporating this new idea are ravioli, risotto, spaghetti and allied food products.

Anti-drip Devices for Bottled Beverages

Reeded-surface bottles with a recessed waist which are easy to hold are being used by Clayton Bros., of London for their soft drinks. The neck finish to the bottle acts as an anti-drip device. The bottle itself is sealed and closed with a Tru-Seal plastic screw closure and the bright and colourful lithoed label on the bottle in the well-known house style, adds the hall mark to the product. Any device which prevents drips is bound to make an appeal both to the packager and the consumer who is well aware of the value of drip-proof bottles and any form of drip mat used for the prevention of drips from bottles or glasses.

A Table-worthy Vinegar Container

There can be no doubt that plastic bottles produced as a result of injection moulding in place of the usual blow moulding process have interesting possibilities. A recent addition to the retailer's shelf is the vinegar bottle which is made as a two-piece injection moulding for the firm of Sarson's. The seams between the upper and lower portions of the container are claimed to be invisible.

The Sarson's bottle has a maroon upper half and a clear base, this combination being chosen by the vinegar manufacturers, after several tests with other combinations. Polypropylene may be expected to offer many further possibilities in the field of liquid packaging and its further development is a matter of current study. In the present material and its formation, the new two-piece fused bottle may be employed for any liquid compatible with poly-

styrene, and there is little doubt that the future development of this idea will rest very largely upon the cost factor which will resolve itself when the fully-automatic production plant goes into operation as is now contemplated. The shape specially styled for Sarson's has been fully tested under field conditions both for ease of working on the existing filling lines and similar handling tests have been carried out on similar designs being developed for other packagers.

The Sarson's vinegar closure is a two-piece construction designed to harmonize to the contour of the bottle itself. It is merely pressed into position on the smooth pouring lip of the container which permits the requisite amount of liquid to flow as and when required. No over-flow or drips are possible with this new device. Other injection moulded bottles are now designed to take standard plastic screw caps with liners, and these are applied by the usual screw capping machines. Prototype plant for the delicate fusing operation is now in production and a general release of this new container may be expected on the market at any time.

Injection moulding, which provides a concise control of wall thickness and a much higher standard of clarity than is possible with blow moulding, does not permit forming of the narrow throat which typifies the bottle shaped container. The obvious advantages of this process have encouraged Pioneer Plastic Containers to make a series of experiments all planned to produce by this means a satisfactory typical bottle. At the commencement, it is the fusing together of the flanges or rims on their standard frusto-conical containers, which produces a package rather like the well-known cocktail shaker in shape. The fusing process has been refined until it could offer a true bottle of pleasing appearance and sufficient strength weighing $2\frac{1}{2}$ oz. against $10\frac{1}{2}$ oz. for the corresponding glass bottle.

Six-colour Printed Fibre Case

Among the novel introductions in case making is the new six colour fibreboard case made for Chivers. This is produced from a white background board material such as gives the designer ample opportunity for good, bold and colourful designing. Fibreboard packing cases have made progress in the use and application of this basic material which places the finished carton, case or container in the field of display. The bleached kraft surface of this new packaging or packing case, as it may be best described, opens up many possibilities for the food and allied trade packager. It is claimed that it is the first time that a six colour printing has been obtained and used commercially in this country on an ordinary fibreboard packing case. The finished result is a shipping container which can compete with multi-colour display cartons specially designed with all the eye appeal and used as an out-and-out selling unit.

This printed fibre case holds a six dozen assortment of table jellies, the case carrying an illustration of the fruit flavours represented in the contents. Printed in full colour on the white background, tops and sides are suitably printed and the pack is almost irresistible. In order to keep the printed design unbroken, the case blanks are glue-lapped

at a speed of from 10,000 to some 15,000 per hour and the projects are in the hands of the Tillotson group of packaging specialists.

New Shrinkable Pliofilm

The importance of the visibility of package contents has been stressed in this chapter. The new Goodyear shrinkable Pliofilm has a special application in the food trade and, in particular, in the packaging of poultry. This film is very strong and may be applied by hand or machine methods. It consists of molecules of the original film aligned in a definite direction for the orientation process. In addition, it possesses all the inherent qualities of Pliofilm, i.e. moisture protection, a high gas transmission rate, strong and ductile at low temperatures, resistant to puncture by sharp bones and other projections and has great mechanical strength. Sheets of the material are cut sufficiently wide enough to provide a $1\frac{1}{2}$ in. to 3 in. overlap which may be seam spot welded by any of the series of hot plate or hand hot iron attachments. The material may also be end twisted if this method of closure is preferred. In the case of poultry packaging, a really tight wrap which makes the chicken so very appetizing in appearance is obtained by momentarily heating the package in a hot air tunnel or on the other hand, by hot water at a temperature of about 190°F . This material, used in this form, is called Shrinkwrap and in bag form, it will hold a partial vacuum; owing to the outstanding shrinking qualities of the material, the wrap becomes equivalent to a skin. This feature is the special virtue of this form of packaging and in view of the fact that almost every chicken varies in size and shape, there is much to be said for a wrap which can be made to shrink to a shape. It is fully transparent so that the produce is fully to view on display or at the point of sale. It will stand the rigours of freezing and storage at low temperatures and ensures, it is claimed, the hygienic exclusion of contamination.

The new ss 75 grade of Pliofilm has been specially developed for the purpose of packaging fresh meat for sale in the self-service stores. This material is now being used to package cheese, coffee, dried fruits, confectionery, and nuts, among other food products.

Sliced bacon too, is also being packaged in a new styled pack, comprising of a colourfully printed gloss waxed folder with a punched window overwrapped with Shrink-wrap. Previous packs for sliced bacon have been vacuum packaged, but this recent pack from which some of the air is expelled by the shrinking process, is claimed to have a shelf life of some two weeks. Care should be taken to ensure that bacon is fully matured when required for slicing in this form of packaging. This method does not draw moisture to the surface of the pack, the pack being quite rigid with sales appeal; the window of the pack is so placed that the lean portion of the bacon is quite visible. It is also claimed that this method assists in cost reduction both on materials and labour as compared with present forms of packaging. Back or streaky bacon, in both 'green' and smoked varieties, is first placed in duplex folders the envelope being printed according to specification in colour for the purpose of quick

identification. These are then overwrapped in Shrinkwrap, the new film with the high degree of shrinkage under conditions of heat. This is now being used in conjunction with the Novotite Mark 2 shrink wrapper. On the machine, the loose wrapped packs pass through a hot air tunnel and this has the effect of immediate film shrinkage, drawing the sides of the pack tightly round the bacon and forming a close fitting film window over the aperture. The Letchworth Bacon Co. combine both hand and machine methods of packaging where bigger pack output is contemplated. At the start of the line, the boned sides are sliced on a Berkel machine which shingles and groups the rashers by depositing them on a band the movement of which may be adjusted to vary the pitch of the shingling.

Boil-in-the-Bag Polythene

Densothene film is something new in cellulose packaging material and is being used for prepared foods so that they may be cooked by boiling in the bag itself. Compared with low density polythene, high density film has greater rigidity, lower permeability to gases and moisture vapour, greater resistance to both oils and fats, high sealing temperature, less transparency in the present grade and less tear resistance, particularly in one direction. Increased tearability can be a positive advantage with unwrapping operations and brings nearer the long sought for tear strip for use with polythene. Made in bag form, lay-flat tubular reels and in reels of sheeting, it may be used plain or printed. New inks developed for printing this film will withstand conditions from deep freezing to boiling water in the home cooking process.

Packs with Carrying Handles

In addition to display carriers for beverage packaging as illustrated in this chapter, a recent addition to this form of pack is the new novel handle provided to small packs of confectionery. This handle is a distinctive feature of the new pack which is being introduced by Meltis Ltd. This

represents a handy pack for the picnic or theatre and may be carried unobtrusively in the hand.

A New Laminate for Wrapping Fats

At the conclusion of some two years experimentation, the Milk Marketing Board are now wrapping their 'Dairy Crest' English, Welsh and Cornish butter in a new laminate made up from pure vegetable parchment and Cellophane MSAT 300. Tests show, it is claimed, that discoloration of the contents has been eliminated and the keeping qualities improved. This is believed to be the first use of this type of laminate in this country. The surface is readily printable in colour and it makes a first class, hygienic eye appealing package.

Experimentation

Research goes on continuously into the uses and application of established, improved and newly formulated materials used for the purpose of food and allied beverage packaging. In spite of the established place held by foods and their containers in modern life, active research into methods of improvement continues in all fields. New forms of laminates, coatings, tinplate seamings, plastics, and impregnates continue to be introduced in the cause of better and often more convenient packaging. Many important tests are carried out and in some cases, pilot filling and packaging plants undertake experiments. It is most important, however, that packaging design and styling should not go so far as to become uneconomic and research should be kept within practical bounds. One specialist has rightly pointed out that this could mean 'a return to the horse', but 'horse sense' must first prevail. There is still much work to be done in packaging but this must follow sound lines based on economics and sound marketing. The annual expenditure on packaging continues to expand but it can only be paid for by increased home and overseas trading and if this is influenced by better and economical packaging, so much the better.

CHAPTER 13

Kraft Wrappings for Bulk Merchandise Packing

MANY kinds of foodstuffs are bulk packed in some kind of kraft wrapping, the material being chosen according to its requirements, i.e. waterproof, moisture-proof, fibreproof, acid and alkali resistant, and fungi resistant. The selection of such a wrapping is also governed by the quantity and bulk of foodstuffs to be packed, their hygroscopic nature and their weight and value. Such a selection is also to some extent dependent upon whether the goods are to be packed for immediate despatch, their destination, or whether they are to be held in store and taken out as and when required for delivery to the distributor.

Glass container packaged beverages must obviously be packed in some form of substantial casing, such as corrugated fibreboard packing cases, plywood boxes, no-nail cases, crates or other strong and rigid types of packing designed to hold a specified number of units when packed for store or transport. In this connection the notes concerning the new Carbion process introduced by the Spicer organization and included later in this chapter will be of interest. Fundamentally, therefore, this chapter deals with the bulk packing of foodstuffs of all kinds in wrappings or some alternative form of packing as opposed to the packing case or carton.

Specialized Papers for Packing

Paper in all its forms is a valuable adjunct to food and beverage packaging and packing and a considerable volume of paper in the sheet, reel or cut as case liners or wrappings is used annually for some form of product protection. New functional and barrier papers are being introduced which retain the moisture present in a product and prevent its penetration from the outside. The efforts of the paper maker and the paper converter are focused to a very large extent upon the food packager and the skilled technician in the mill laboratories is constantly seeking new barriers to provide even greater protection for the food product where such protection is needed.

It is largely this co-operation between packager, packer and paper specialist which has resulted in the development of so many packaging papers which are of the greatest value to the food packager.

Choosing the Wrapping

The important considerations which should be taken into account where new products are being bulk packed and which must very largely influence the choice of wrapping material are outlined at the beginning of this chapter.

Testing Strength.—Wrappings can be tested for bursting strain and plucking strength on such apparatus as the Mullen tester, the latest model being in advance of anything so far produced. For estimating the bursting strength of all kinds of thin, medium and heavy weight papers, board material, textiles and sheets where high pressures have to be considered, it is essential always to have clearly defined conditions relative to compressive pressure. The new device with hydraulic securing facilities makes it possible to carry out all kinds of bursting pressure tests with great precision and under experimental conditions that are at all times reproducible.

The bursting pressure tester consists of the actual basic instrument, the hydraulic holding tension device and the special gear motor. This testing equipment is suitable to stand on the desk of the paper specialist buyer and may be used to test such materials as tapes, laminated materials and every kind of medium used for storage of merchandise packed away in paper and board. The testing instrument itself has a cylinder made from special cast iron which is filled with glycerine. In the cylinder is carried a piston for producing the pressure gauge from which the bursting pressure is read. At least three tests should be made in different places in the sheet under test and a mean average percentage of breaking worked out. Paper often has more strength in certain directions so that both directions of the sample should be tested.

On the fixing flange of this machine is the diaphragm, which is held by the fixing ring and the lower pressure plate. The fixing of samples under test is carried out by actuating a lever. The adjusting bell is thereby lowered and attains a maximum compressive pressure that has been pre-set, and this may be read off an additional manometer in kg./sq. cm., or in lb. per square inch. The lifting of the adjusting bell also takes place automatically after operating a lever. The breaking strength of a kraft wrapping is important where the paper has to take severe strain in weight, bulk under adverse conditions of storage or export overhead.

The plucking strength of paper or board material is for practical purposes the tearing load obtained calculated for 1 cm. width of strip and at an effective angle of 36 degrees. The Mullen tester is used by many paper buyers and may be considered as an important adjunct to materials purchase and usage.

Testing Weight.—The weight of paper may be accurately tested by use of a paper weighing balance which gives the weight of a ream of paper from a small sample under test.

The Micrometer will give the caliper or thickness of either paper or board material and such a piece of paper testing equipment may be obtained small enough in size to fit the waistcoat pocket. Other machines such as the Schopper tensile tester are used for evaluating the strength of paper or board as a result of a strip test. At the point of paper fracture, the dial registers the result. Here again, several tests should be taken in order to arrive at a mean average.

It should be noted here that reliable grades of branded papers are usually sold with a standard breaking strength and this should be specified at the time of requisition of paper supplies.

If the paper to be purchased is required for printing, what is to be the process of printing? How is it to be used and how made up and in what form, i.e. booklet, folder, catalogue, price list, broadsheets, etc.? Is the job to be temporary or permanent? This will influence the quality of the paper as where permanence is required, pure or wood free paper should be used. Are there to be illustrations and are they half tone by the letterpress process of printing or line?

Print on Paper.—Food and beverage packagers are also interested in printing paper for price lists and catalogues to assist in selling their products.

Temporary printed matter may be produced on such grades of paper as newsprint, cheap supercalendered printing and suchlike papers. On the other hand, printed work of permanence requires better grades of paper such as esparto, chemical wood papers, and the best types rag papers for complete record documents, etc. Clay coated papers are best for colour work from half tone blocks used in the letterpress process of printing. Machine process coated papers are suitable for magazine and book work.

Always specify weight of paper or substance, colour or shade and if possible send a sample for matching purposes. Mature paper is best and stores better and prints perfectly on the press. Opacity may be desirable and this must be watched and tested. Simple tests may be carried out by overlaying a sample of paper on some printed matter and studying the look through. Wear and tear resistance may be required in both printing and wrapping papers and here one of the manilla group of papers is best. Surface or finish may be important and the degree of finish may be specified both for stock orders of paper and for makings. Anything from antique finish to highly glazed or friction glazed may be obtained as required for some special purpose or process.

One very important point in paper specifications is not to ask for strength if this is not essential as some other more important feature may have to be sacrificed in order to provide it. This applies to making orders of paper.

Erasure may be a desirable quality where papers are required for recording purposes and where certain detail may be varied. Strong rag papers will stand up to this treatment. Other papers must fold and score well and all of these factors must be noted and specified when buying paper.

Simple tests may be carried out in the paper buyer's office for tearing strength, opacity, transparency, surface

and coloured papers fastness to light. Pieces of paper may be exposed to sunlight by affixing to the window for a day or so and any marked degree of fading may be estimated by comparison with the original sample. Paper may be made fast to light if required and this has to be specified at the time of ordering a making from the merchant or mill.

Experience Counts.—The practice of specifying paper and board of all kinds used for wrapping, packaging, printing, office stationery, and printed matter, is something which comes with experience. Approved and tested qualities should be maintained in sample form for ordering repeat quantities and for comparing with new supplies. Various types of paper, i.e. printing and writings are made and stocked in regular sizes in the flat sheet and packed in reams of 500 sheets. Reference may be made to standard paper tables which appear in many reference books of paper. Kraft wrappings used for packing bulk merchandise are made and stocked in a set of standard sizes and weights and these details may always be obtained from tables in reference books. In the case of kraft wrappings, both the name, i.e. Imperial, Casing, etc., and the size they represent should be quoted in order to avoid misunderstanding as names and sizes vary in different parts of the country according to the type of merchandise packed.

The merits and quality of branded papers of all kinds are established among packers, packagers and paper buyers and one should not be tempted to try out other grades of paper or board material if a proven quality has given complete satisfaction. Troubles have arisen from change in quality for some slight advantage which has often turned out to be detrimental. Paper buyers should specify their requirements based on the results of past experience and such matters as size, weight, bulk, waterproof qualities, strength, tear resistance should be maintained for complete satisfaction. Where printed work is concerned, the quality of the paper should not be sacrificed for price considerations; it is far better to cut down the quantity than the quality. The ultimate use of a paper must influence the choice of paper and where special requirements are desired, for example, of a wrapping paper, these desirable features must be stated and tests made to ensure that they are present.

Paper Storage.—In addition to the paper merchants and distributors' stores, most manufacturing plants and merchants carry medium to large stocks of paper and board material in connection with process of manufacture or packing and packaging projects. Paper figures vary largely as part of the process of manufacture in that it is required for various functions connected with the production of other products.

Paper is a costly item which should be handled and stored with care as valuable raw material. Paper is delivered in flat packages or reams, in bales or bundles, or in reels or rolls of varying diameters, weights and widths. Other adjuncts to manufacture, such as adhesives used in packaging and boxmaking, come in barrels and drums and need storage room and conditions which give ease of usage and general accessibility.

The pallet system is best for paper and board supplies as materials are kept off cold stone floors thus allowing a current of air to pass under supplies which generally helps in the maturity of the paper. Loads stocked in this way may be moved, as and when required, by means of a truck or forklift so that paper may be moved to point of usage without manhandling paper ream by ream or reel by reel.

Paper must be kept away from damp which causes shrinkage and curling and also away from heat which brings about cockling and waviness. Strong sunlight will cause paper to fade where reams are broken open at the sides and corners. Temperature should be constant as paper reacts to rise and fall of humidity conditions. Where paper is left in storage at an outside wharf or warehouse, careful records should be kept of dates of supplies as first in should be first out. A good stock card system is essential and records should be well kept. Any broken parcels of paper are best re-wrapped to avoid deterioration or fading of coloured papers.

Here are some facts for the large paper and board store keepers:

1. Manhandle paper supplies as little as possible.
 2. Avoid dropping of reams, reels or bundles and see that the corners and edges of parcels are secure.
 3. Avoid extremes of heat or cold in place of paper storage.
 4. Store away supplies in original wrappers until required.
- Some papers are delivered in battens and waterproof wrappings and these act as a barrier in the case of coated and special types of paper.
5. Allow new paper received to relax and mature and test paper where possible for relative humidity.
 6. Avoid dropping when lifting paper and use old stocks before new arrivals.
 7. Keep the warehouse clean and free from dirt and avoid dirty hands when handling unwrapped materials.

Waterproof or pitched lined krafts may be used to cover stone floors where other methods of storage are not available.

The Latest Protective Kraft Wrappings

Foodstuffs of the fancy kind, often packaged in glass or earthenware containers, need some form of protective bulk packing and here again, the fibreboard packing case, suitably styled to hold a specified number of units, is the answer to the bulk packing project. Other kinds of foodstuffs are now being bulk packed in wrappings, and as pointed out, they must be chosen and tested against the requirements involved. The choice of wrapping is important and advice may be obtained from the wrapping specialist. A suitably strong, laminated, bitumen lined wrapping made from sisal fibres or some other basic fibre now used in the manufacture of kraft wrapping, will, together with some suitable kind of inner bulky protective material such as corrugated paper, bulky brown, offer all the desired protection to bulk packed foodstuffs, where they are packed either for storage or transit for the home or overseas markets.

Extra Strong Tough Sealing Tapes

New fibre glass wrappings and glued tapes are now

awaiting final approval by the appropriate authorities and it is only a matter of time before these new materials will become available to packers of merchandise. Fibre glass glued tapes, for example, are untearable in certain directions. This means that less tape is required for sealing cases, cartons, containers, and kraft wrapped packages and bales. Sisal reinforced bitumen loaded wrappings, wrappings coated with polythene as liners, and copper sheet backed bonded krafts are some examples of new materials coming into usage as case liners, the make up of multiwall paper sacks, and as direct wrappings for bulk merchandise storage or transit. Much of this material now replaces former wooden cases thus saving costs in material, freight charges and space volume.

Other forms of coating and reinforcing treatments to kraft wrappings render them waterproof, fireproof, acid and alkali resisting, and wrappings do not support mould growths and fungi.

Where packers are unfamiliar with these relatively new types of wrappings, full sample sheets may be obtained from the makers and, in most cases, the normal supplier of packing materials and equipment will be able to obtain sheets for testing purposes.

The latest types of laminated wrappings are tinted in pale shades so that packed merchandise in transit or store is immediately recognized when required. Fibreen is a heavy duty wrapping with wet strength qualities and in this case, the surface is coloured pink for easy recognition of contents. This material is used for crate and case liners and may be supplied in rolls of suitable width and lengths, cut sheets or prepared to size for case lining.

Severe tests of this material have been made by car companies and reports as to its protective qualities are very favourable. It may be used for medium to large size heavy bale packing. Fibreen is a medium to a strong material, its weight being 48 lb. per 100 sq. yd. with a bursting strength of 94 lb. per sq. in. A heavier grade with a weight of 57 lb. per 100 sq. yd. has a bursting strength of 111 lb. per sq. in. This is used for bag lining in addition to the usage outlined above. Fibreen heavy duty kraft carries a heavier weight of bitumen and has one side wet strengthened. This grade also has a tinted under side and may be used for storage. Fibreen is also made on narrow width reels in crêped form and is very pliable. The weight is 88 lb. per 100 sq. yd. with a bursting strength of 117 lb. per sq. in. Such a grade may be used for wrapping many types of circular objects made from various materials which need protection. It is also used for protective purposes of many kinds.

Fibreen krafts in crêped form are very strong and are made to comply with the Ministry specification relative to the packing of government stores. The heavy crêped sheet with a wet strengthened surface has a weight of 104 lb. per 100 sq. yd. with a bursting strength of 120 lb. per sq. in. This grade is fully protective and will find a use in wrapping valuable and delicate merchandise and articles for storage in perfect condition.

Moistop is another new wrapping and is an ideal moisture vapour barrier consisting of a two-way sisal reinforced sheet with two inner coatings of bitumen and a layer of



Sisalkraft being used for the protection of sugar beet.

polythene on one surface of the kraft. It has a weight of 55 lb. per 100 sq. yd. and a bursting strength of 112 lb. per sq. in. The moisture vapour transmission rate is 6 g. per sq. in. per 24 hours. Moistop incorporates pressure sensitive cold seal closure qualities and may be considered as the most advanced form of packing material for many kinds of merchandise requiring protection from the elements.

Sisalkraft.—Sisalkraft and other strong wrapping materials may also be obtained glued in coil form so that it may be used to seal and pack bales of merchandise. Made in

various widths, two inches is considered ideal to seal and secure to seams and flaps of bales. One string of moistened glued tape is used at each flap end of the bale and another long strip for the centre seam. This tape may be obtained printed with code marking, stock numbers, bale details or the packer's name and trading slogan so that goods may be readily identified in stock or storage. Glued tapes may be cut off to predetermined lengths, moistened and dispensed on foot treadle machines so that the packer's hands are free for folding, pleating and sealing packed bales of merchandise.

Sisalation reflective thermal insulation and moisture vapour barrier is another high grade wrapping material which may be used for packing articles with a sensitive surface, valuable articles and moisture sensitive merchandise in need of full protection. This is a thermal insulating material consisting of standard sisal kraft faced on one side with a highly burnished foil giving a sheet with a very low moisture vapour transmission rate. It may be used for



Above: Greenstuff ensiled in a Sisalkraft silo.



Right: Maize being dropped and ensiled in a Sisalkraft silo.

direct wrapping or as a case liner to pack such items as scientific apparatus, laboratory testing equipment and highly polished surfaced products and instruments which may suffer from extremes of hot or cold in transit or in store both at home and in the Far East. With a weight of 63 lb. per 100 sq. yd. and a bursting strength of 126 lb. per sq. in. and a moisture vapour transmission rate of 0.5 g. per sq. m. per 24 hours, such materials may be used in place of wood cases and crates thus saving space and costs.

Aluminium Foil.—Sisalation is also made with aluminium foil on both sides of a kraft surface and in this form it is called double sisalation. It possesses outstanding qualities and is fully protective in every way.

Another new first class merchandise wrapping and case liner is a copper armoured sisal kraft. This unique product consists of pure electro-deposited copper sheeting backing to a sisal reinforced kraft base; it is also bitumen bonded and has a crêped finish for pliability. It is absolutely unsurpassed for protective storage coverings, for the weathering of pent-roofed cases and shipments of merchandise destined as deck cargo which may be liable to sustain severe trials under long exposure to sun and rain. Its weight is 190 lb. per 100 sq. yd. It will do all that other hard materials can do at less cost and volume.

Most standard kraft wrappings will stand up to constant and rough handling but they must be kraft material and not just brown wrappings. Most krafts are made from chemical wood pulp, they are strong and have a glazed surface which renders them more durable. Sisal krafts and bitumen loaded kraft wrappings are also strong and may be used for packing goods for store and despatch. Ordinary bulky merchandise which needs enclosing without any special protection may be safely packed in current kraft wrappings. Most of them are capable of resisting fungi and mould attack, some are fire resisting but most of them will not stand up to exposure in wet conditions for any length of time.

Where doubt exists, some consultation may be had with the normal supplier and sheet tested under field conditions for assessing the final result.

Cross-crêped Kraft

Packers of heavy bales and merchandise will be interested in a new packing and packaging kraft described as cross-crêped kraft. This new grade is claimed to be stretchable in both diagonal directions in addition to the machine and cross-machine directions of the paper. It also retains its elongation and is capable of being coated, glued and otherwise treated, moulded, die-cut and slit to reels and coils of varying widths and diameters. The basic material is a kraft paper in the weights of 40-90 lb. and it may, in addition, be treated or impregnated with wet-strength resins, agents which assist waterproofing, fungicides and a flame-proofing medium.

PATRA's publication '*Packaging Abstracts*' reports on



Brewers' grains being stored in a Sisalkraft silo.

this kraft and at the same time on a German bitumen-coated sack paper additionally coated with polythene in order to provide greater folding and creasing strengths. A section of the book is devoted to packing cases and containers and discusses plastic interiors for wooden cases for bottles; single-trip containers for liquids which will withstand jarring of a 4 ft. fall (Abstract 2600) and a container made from rigid p.v.c. film with non-toxic stabilizer suitable for such products as mayonnaise and concentrated foods (Abstract 2665).

Protective Wrappings

Bulky soft wrappings, corrugated materials, wads and pads, are all very suitable for protective wrappings for soft merchandise and in some cases, fragile articles where the cushioning nature of corrugated wads assists in the protection of corners, handles, lips and curves of certain articles. Corrugated is now made up in many forms in sleeves, jackets, cut sizes and shapes in several ply if needed and it is fully protective in this form. Any type of merchandise which is not subject to deterioration in store or storage may be suitably wrapped in everyday brown bulky wrapping. Many of the wrappings in this class have a trade name and this may vary in relation to trade usage or location.

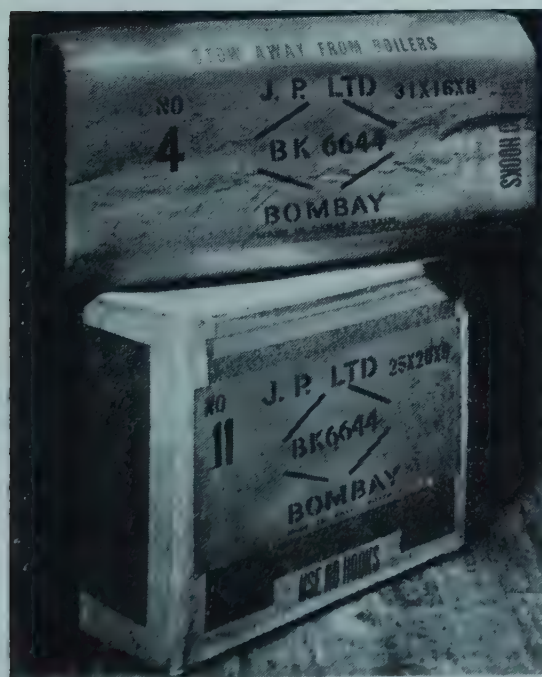
There are bag caps, bag papers in general, bulky wrappings, sugar bag papers, caps, railway buffs, papers for light wrapping purposes, cork papers, a coarse material treated with a coating of adhesive or powdered cork, which makes up into a very protective form of wrapping, grocery and foods papers, chemist's blue, bottle papers and wraps, hosiery papers for bulky materials packaging, to mention some of the specialized trade wrappings. Many of these papers are made in cream shades, pale buff, medium to deep brown in colour. It is important that wrappings be ordered by name and size dimensions, and here are some popular sizes of general wrapping and packaging papers:

| | in. |
|------------------|----------|
| Cap (Bag) | 24 × 29½ |
| Cap (Havon) | 26 × 21 |
| Casing | 36 × 46 |
| Elephant | 24 × 32 |
| Small Cap | 17 × 25 |
| Small Hand | 30 × 40 |
| (Double, Double) | |

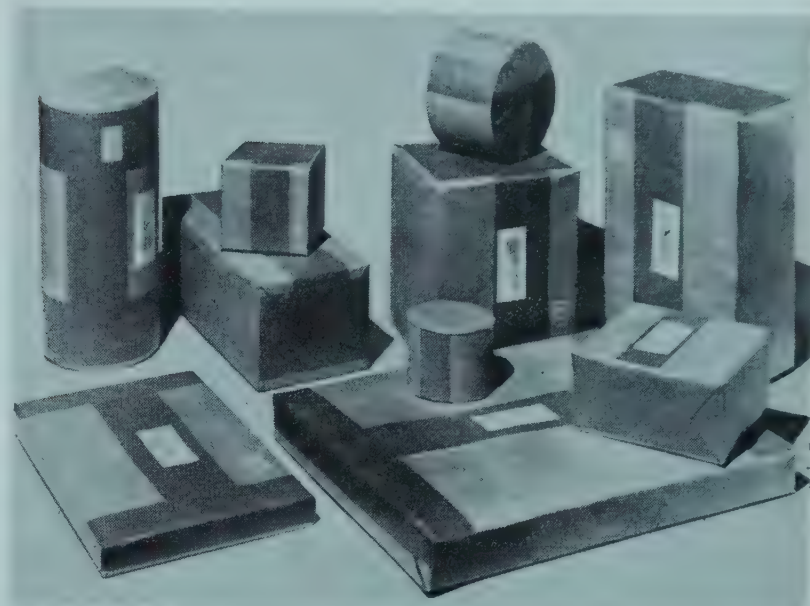
The original wrappers in which the goods are packed may need to be reinforced at the corners and edges of the packages, the most vulnerable point of any wrapped merchandise. Reinforcement of this kind may be carried out in the case of circular packages with glued kraft circles which are made in various diameters. These are very strong and are quickly applied to either or both ends of a circular bale adding the necessary strength. Flat packages may also be reinforced with strips of glued tape at the edges, seams or corners of the package. Any dropped packages or carelessly handled rolled goods would stand up to much more strain in this way. Triangular cut out pieces of thick kraft wrapping may also be glued on to the corners of bales affording added strength where goods are packed in poor grades of wrapping material.

Glued stickers may be obtained with either letters or numbers so that incoming goods for storage may be coded or marked with reference number or letter. In this way, first goods in may be planned or arranged to be the first out. This is important in the case of certain perishable products, foodstuffs, matured paper and board for printing or converting processes and seasoned goods.

With better and more efficient varieties of packaging materials, it is far more important to handle goods carefully than worry too much about humidity or air conditions in warehouses or stores. In some cases, however, these details have to be considered; it will depend upon the product. In the main, provided that there are no extremes of heat or cold, wet or draughts, strong sunlight, most products that are well packaged can remain in storage for long periods.



Bulk merchandise packed in waterproof kraft wrapping and fibreboard cases, securely sealed with sisalkraft glued kraft tape, the packages being consigned to Bombay. Such packages are now being despatched daily by air, sea and land to all parts of the world in perfect safety.



A group of well-packed products in waterproof kraft wrapping—in this instance, sisalkraft has been used—the final packages being sealed with glued kraft tapes of suitable width and strength, the package being labelled with details of consignee. Note too, the roll and circular packages which have been end secured with edge roll protectors and reel end glued circles made from strong kraft wrapping material.

Cartons, cases and containers in certain instances are inner coated with protective moisture barriers such as polythene; they are wet strengthened on the outside of the material, and moisture sensitive merchandise will remain in first class condition if the original wrapping or package is left sealed. Many types of goods have an inner protective lining as a wrapping medium such as waxed paper or tissue and where these have been used in the process of packaging, such goods should be left in their original wrappers until the point of usage.

Wrapped or cartoned goods of any kind do not improve with continual or unnecessary man-handling. This points to the use of some form of suitable stillage, trucks, tray or pallet on which to store goods off the ground. Pallets permit a current of air to pass underneath, a feature which is often desirable in the case of some types of stored goods.

There are many types of box pallets so that small packages may be kept together in specified quantities.

Here are some important factors which govern the handling of stored materials of most kinds:

(a) Wrapped or carton merchandise should be handled as little as possible and only when required for distribution.

(b) Care should always be taken to protect edges and corners of kraft wrapped goods.

(c) Regulate the temperature in the warehouse or storage place in much the same way as heating installations are controlled in the factory and office.

(d) Only remove wrappers if they are broken but always make first aid repairs as outlined.

(e) Old stocks should be coded and used in rotation.

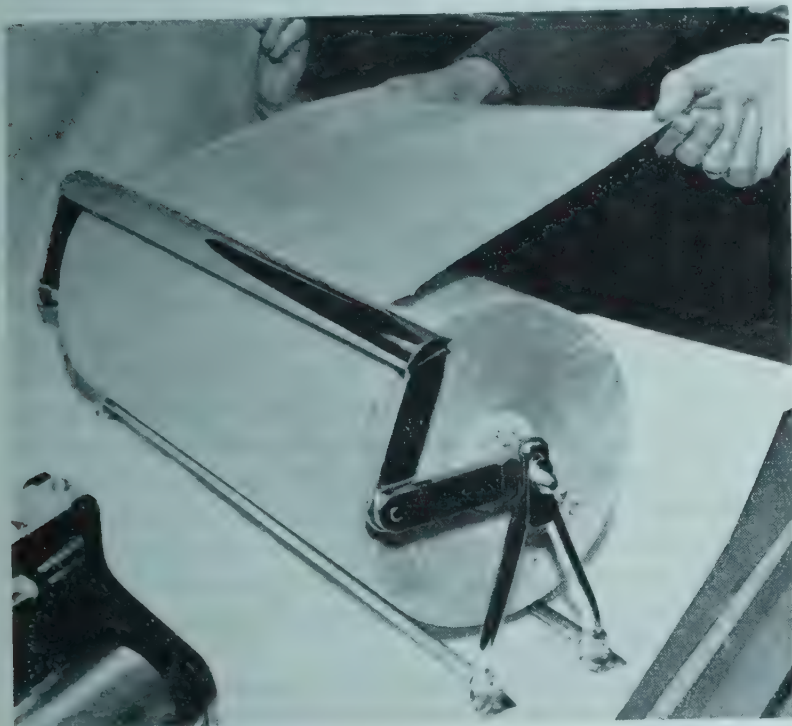
(f) Care should be exercised by those handling stocks and in some cases, clean hands may be essential.

Strong sunlight can penetrate thin wrapping papers which have broken at the edges or corners. This may be responsible for deterioration in some products or fading in colour of

cloths, coloured materials, paper and boards. All goods should be stored away from hot steam pipes or boilers. Ordinary clean, well-ventilated conditions are best for the storage of most products.

Reel Wrappings and the Counter Roll Holder

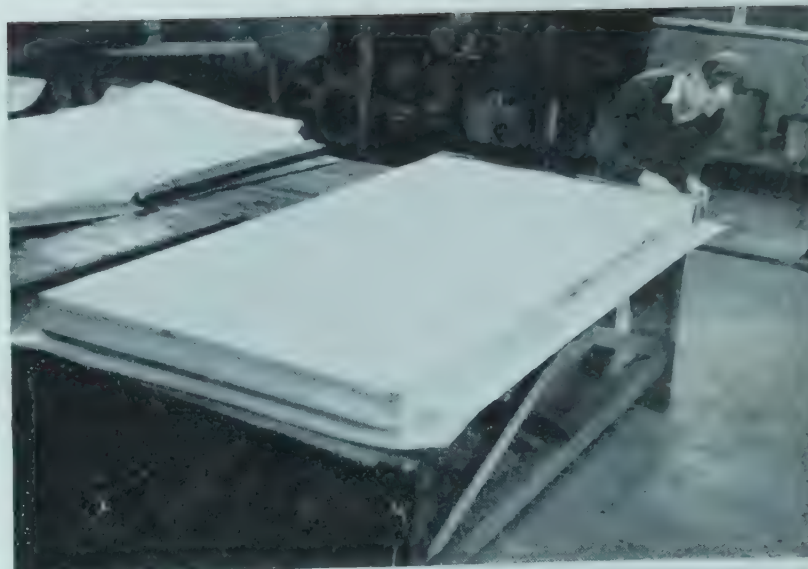
Light weight brown and fancy wrappings are often used from the reel or rolls of varying width and diameter, such material being fitted into and dispensed from some form of counter roll holder. Fancy papers, packaging papers, sulphite wrappings, lightweight browns and many other types of wrappings may be dispensed from the counter or standard type, hanging or bracket model counter roll holder appliance.



The latest types of universal model are illustrated. These may be used in any position on the bench in the packaging department where various packaging and packing operations in kraft wrappings or fancy papers are being carried out. They are ideal for the distributor or retailer and take up little space. The requisite amount of wrapping may be pulled forward and dispensed as and when required without wastage. Wrapped packages may be sealed with tying tapes, glued tapes, self-adhesive pressure sensitive tapes or some other form of seal.

Case Liners

As has been pointed out, any types of kraft wrapping may be specially cut to specified sizes for the purpose of case liners and many of the more recent protective kraft barriers are now being used in this way for the protection of sensitive or hygroscopic products packed for home or export transit. Packing cases made from wood may also be lined inside with zinc or tinsplate but this is only employed where valuable merchandise of a particularly hygroscopic character is being despatched to the Middle and Far East where conditions of humidity may impair the contents of a packed case or a consignment. Reinforced bitumenized and laminated case liners generally provide all the desirable protection for the most delicate food products so packed



Sheets of plywood laid in position along the creases and afterwards being lined and reinforced with Fibreen wrapping or lining material. This material makes an ideal case liner where extra protection for the product is desired.



Some types of bulk packed merchandise may be consigned for export in pent roof packing cases designed to be sent as deck cargo. The top of the case, or in some cases, the pent roof itself, may be securely reinforced from wet penetration by fitting tops with an impervious roof covering of copper armoured sisalkraft.

for transit overseas but advice may always be sought and obtained from the maker or supplier of the specialist case liner or wrappings material.

Multi-wall Paper Sacks and Bags

The use and application of the paper sack and bag continues to grow very rapidly, and with the introduction of special bag liners, a very wide range of products may be so packed and packaged. They are particularly suitable for powdered products, granular or crystalline foodstuffs of various kinds and for hygroscopic and non-hygroscopic powders and foods. The more recent 56 lb. paper sack has been designed with a view to ease of handling and conveying thus avoiding worker or handling fatigue at the point of

filling and loading. Pig and poultry feedingstuffs are now increasingly packed in this form of sack for ease of handling and storage and the considerable wear resistance or strength of the multi-wall paper sack and bag amply protects the contents in good condition until required for distribution. The Ministry of Agriculture is taking an active interest in legislation stipulating the maximum sack loads which may be recommended and used for agricultural purposes.

There are some economics in the use of paper sacks or bags and their price compares very favourably with other forms of packing, notably wood and fibreboard materials. The ease of handling, conveying, stacking, if efficiently packed or filled, their absolute hygienic property, and the fact that they may be printed in colour, all adds appeal to their use and application. They pour well and it is claimed that they empty 'clean' and leave no wastage of material behind. The contents are also kept in factory fresh condition being used right down to the last vestige of material. They are now efficiently sealed after filling in order to prevent sifting and filtration of foreign matter.

New wet-strengthened materials are being used in the make up of the paper sack and with the use of water resistant adhesive for sealing and closing seams and ends of sacks, they may be used for the packing and transit of all kinds of food products in the form outlined, both for the home and overseas markets.

Where the sack or bag is suitably filled, they stack on the wooden pallet very well and it is claimed that products so packed may be stacked 50 high, each stack of filled bags containing some thousands of tons. The use of an outer ply of crêpe kraft tends to obviate the danger of the stacked bag slipping while in store or transit, if they are stacked in tier form.

Basic Materials for Paper Sacks

While there are standard types of paper sacks and bags, tailor-made containers can be supplied to specified conditions. The wide variety of waterproof materials now available for the purpose of their manufacture enables a sack or bag to be made to any specification. These bags are now made in two to six ply wall thickness, and one container may be put inside another garment sack in order to provide additional protection from humid conditions where goods are exported. Various weights and substances of paper, colours and styling are now available in the latest forms. First class moisture and water resistant qualities are now imparted to the modern sack and these are made from laminated and bitumenized kraft papers. Waxed kraft is also used in the make up of the moisture resistant bag and these are kraft coated or impregnated with paraffin or amorphous wax. Polythene coated kraft, which has a high degree of resistance to moisture penetration, is used in the make up of sacks and bags where milk powders and similar products are involved or where absolute purity and anti-scuff qualities are desired. Coating kraft papers with silicones makes it possible to pack resins and bitumen at near-boiling point, the bags being stored in moulds while the contents cool off and subsequently, the bag easily strips off.



Cattle feed is now marketed in Medway multi-wall paper sacks in 80 lb. units. This weight is well within handling capacity and conveniently makes up into tons for bulk ordering.

Filling and Methods of Sack Closure

These sacks and bags are very adaptable in that there are several forms of packing and bag sealing. Containers may be filled by hand methods, the mouth being closed and secured by wire ties or stitching devices. On the other hand, current methods of mass production and bag filling are catered for by high speed packing line filling so that sacks may be dealt with rapidly by automatic filling and sewing machinery. Filling is also carried out by the valve packers. Current developments in printing inks and printing processes enable the user to introduce some first class colour designs on the face of the sack or bag, thus converting the container into a travelling salesman. It is claimed that modern paper sacks have special properties of frost resistance so that they have a special application for the storage of vegetables which may suffer from attack of frostlike conditions where otherwise stored.

The open-mouthed sack is one of the popular types now in use and this lends itself to speedy filling and closure methods. The other type is the valve variety which requires specialized filling apparatus. Various kinds of sacks are produced for light, medium to heavy duty filling and handling. Light types are best for local or short distance delivery from manufacturer to distributor or retailer by van or lorry while the medium type will stand up to the handling of rail transport conditions with intermediate handling. There is also a heavy duty type of sack designed for the export market or where there is constant handling under adverse conditions. Where sacks are required for exceptional conditions of storage or handling, some reference should be made to the supplier. All information should be given in the initial stage of a new order, e.g. the nature of the commodity to be so packed, its weight, whether it is hygroscopic or otherwise, if the product is acid or its general

characteristics, and the existing conditions of handling, storage and volume of material to be packed.

The use of the multi-wall paper sack and bag is being constantly extended, prepackaged vegetables, animal feed-stuffs, powders and other granulated materials being among some of the items now packed in bulk in this form.

Shockproof Materials

Straw jackets, sawdust, wood wool, paper shavings, shredded material produced from waste, shredded viscose film, wads, pads and cushions made from corrugate materials, cork coated paper are among the popular materials used to pack bottles, glass and china containers and all these materials have an application in their various fields of usage. The new Spicer Carbion sleeve is worthy of consideration by the packager of bottled wines and spirits and other glass containers.

This is a first class example of the progressive outlook in the field of packing and packaging materials and their application and serves to illustrate the progress to provide further protection and general enhancement of the product and its presentation to the market.

Carbion Process.—Carbion is made by passing strawpaper or a similar suitable base material through a machine in which heated rolls with a special profile emboss it with a pattern. Under the action of pressure and heat the pattern cannot readily be flattened. The resultant Carbion product is known as rigid Carbion, although it is 'rigid' only in so far as it cannot be stretched. The wavy embossings of which the pattern is made up yield to pressure, but regain their shape when the load is removed; in other words, the



The protective nature of the Carbion sleeve used for Haig's whisky. The glass containers are amply protected in this neat and attractive sleeve.

material is resilient. This is in complete contrast to ordinary corrugated paper which flattens under load and, once flattened, no longer possesses any cushioning properties. Carbion has the further advantage that it can be bent in any direction without breaking and, by selecting a suitable base material, it can be made soft, stiff, moisture-repellent, acid-resistant, pH-neutral, greaseproof or any other desired quality.

When the delivery of the material from the patterning rolls is inhibited, the individual ridges are telescoped into a closer pattern. This product is known as flexible Carbion because it has the additional feature of being elastic. By



Canned ham packing in shock proof material.

pulling the edges of the material the ridges can be pulled apart and tend to spring together again when released. In its 'tight' form flexible Carbion has maximum resistance to crush and impact and, therefore, next to no cushioning properties. If flexible Carbion is stretched, the crush and impact resistance is reduced and the resilience of the product affords cushioning and shock absorption. Flexible Carbion also has a very high load-bearing capacity and, by controlling the amount of stretch for any given application, any required combination of the impact strength of the flexible and the cushioning properties of the rigid material can be achieved.

The elastic properties of flexible Carbion are best utilized by forming the material into tubes or sleeves which are slightly smaller in diameter than the object they are to protect. Careful design of the sleeve for a given product ensures the correct amount of stretch to give the desired balance between crush resistance and cushioning.

The use of Carbion products in sleeve form and the inclusion of rigid Carbion for case lining often results in a considerable reduction in the cube of the outer pack. In many instances, the versatility of the material is responsible for labour savings at point of application. In addition, Carbion products are light in weight, pack flat and occupy a minimum of storage space. They lend themselves to palletization and are easily adaptable to modern workshop practice.

Printed Linen Bag Packaging

This once popular form of food product packaging is now being replaced by various other types of wrappings and bags made from foils, laminated materials, viscose films, and laminates of wet strengthened papers and inner liners. However, there is still a demand for cotton, burlap and linen in connection with the make up of bags used for packaging flours, pastes, animal feedingstuffs, rice and cereals among other food products. From fine to coarse fabrics are used in the make up of the linen bag, most of which will print well in colour with design and any necessary wording. Some bags have an additional surface coating to render them suitable for better class printing among other purposes, notably eye appeal.

'Breathing' Qualities of the Linen Bag.—Linen bags are also made so that the sift and flow of contents are reduced to an absolute minimum. Where the contents of the bags have to 'breathe' this form of packaging may be considered. Small quantities may be extracted from the bag, after purchase by the housewife, and the remainder should keep in good condition. They have considerable strength and will stand up to wear and tear. Often described as a utilitarian method of packaging, they have no special facilities such as are now required in food packaging, e.g. product visibility, heat-sealing facilities, moisture and damp protection, light penetration, and it is not possible to prevent sifting, leakage, grease pick up and possible penetration or the retarding of rancidity of the product where such important aspects of packing are required. Furthermore, the linen bag cannot be wet strengthened.

Style and Design

In most cases, standard bags may be used for packing products of the variety outlined above. Lightweight to bulky products may need bags made to a specification and this is most desirable at the onset of a new scheme. One hundredweight, or slightly over, is the maximum size made in view of handling, store and transit problems. All details, therefore, should be given to the manufacturer concerning the bulk, type of produce, weight to be packed, handling, storage, and printing requirements, so that the correct fabric is used in the make up of the bag. A plain woven fabric is a popular bag making medium while such combinations of cotton linen with paper and other twills are used for added strength in all directions of the bag. Unbleached fabrics are used for bulk packing as bleaching is inclined to reduce the strength of the fabric.

Bleached fabrics are used for smaller and more decorative linen bags. Various impregnations are employed to afford a certain degree of moisture resisting properties to the finished bag. These include treatment with plastics, latex and bitumen.

Linen and cotton bags are printed, in the main, during their manufacture as a complete operation, the printing process being carried out in letterpress, litho or aniline. Some bags are printed two or three up by the packager, as a separate process. The number of colours is usually two or three but good design can produce a first class printing in two colours using the white or cream colour of the linen thus producing a three colour effect. Surface treatment is first class and most forms of printing may be reproduced with good effect.

Filling and Closure Methods

Automatic filling machinery follows the same lines as most forms of bag filling processes. Some packers still use hand filling methods and this will depend upon the product and the quantity to be packaged. In all methods of filling, the closure is made by sewing, stitching or wire and clip sealing. The completed bag, when filled, has two seams, one side and a bottom seam, the top being sealed, closed or stitched as desired to suit the product. The mouth of the bag may be sealed by drawstring closure and this is a convenient form of sewing where the consumer may be expected to use small quantities from the bag and re-seal.

There is no doubt that the introduction of new types of bag making materials and laminates have taken the place in some cases of the linen and cotton bag, but with the ever growing needs of packing bulk and packaging unit items, this established form of bag packaging for various types of products will continue to find a place in many schemes of product presentation.

Jute Cloth Bags

These have an application in the bulk packing of potatoes, vegetables, sugars, pulps, and similar food products the bags being in most instances, returnable. Their length of life, wear and tear properties, their ability to stand up to the stresses and strains of severe handling, weather con-

ditions, cartage and the fact that the porous nature of the material permits of 'breathing' (a quality which is often desired in produce packing) and their re-usage marks them out for consideration. Additional treatment to jute bags will render them fire-proof, proof against mildew and acid fumes. The fact that they may be dyed and coloured and more recently, treated with some form of inner liner such as plastic films, which renders them proof against moisture penetration, ensures that their popularity in certain fields of produce packaging will remain fairly constant.

There are various forms of sewing and the choice of type will be related to the product so packed. The most popular style is termed Union Sewing and this is usually employed where pulps, sugar, animal feedingstuffs, potatoes and general vegetables, flour and suchlike fine powders are packed. Bags may be printed in one or more colours and against a light buff background, the packer's trade mark or message stands out very well. Jute cloth sacks and bags with paper and other laminates are established forms of packing, particularly for the export market. Paper and film lined bags are specially suitable for the storage of certain products and tests should be made to ascertain the suitability of any particular bag and liner bearing in mind the type of produce it is desired to pack and store in this form.

Bulk Packing Progress

A new two-ply Palfsack has been recently introduced for the prepackaging of vegetables. These new sacks incorporate features which render both the filling and handling of the filled sack much simpler and among the advantages claimed by the maker are a special construction at the base of the bag which makes them capable of withstanding rough handling and other adverse conditions. Tests have been carried out by prepackers in various parts of the country and these indicate that the ease with which the Palfsacks now open to facilitate filling should speed up operations in packing stations with resultant economies in labour costs. This company is making considerable progress in sack and bag making in connection with other industries and a new three-ply sack, incorporating one ply of Nevermold fungicidal paper, has been developed for the bagging of both seed and Ware potatoes, the sacks themselves having been successfully used by well-known growers and merchants in the North of England. The advantages claimed are that it safeguards the seed against fungi and other pests, in particular, potato root eel worm, which usually results also in the deterioration of the container. After severe tests of all kinds, the fungicidal properties are said to be effective even after prolonged exposure to moisture and many months of storage in severe tropical conditions.

In addition to the prepackaging of potatoes, the packing of apples, carrots and cabbages is being investigated. Ten 3 lb. packs of apples or carrots, were packed into each multi-wall sack, the weight of cabbages packed varying according to specification. The filled sacks were despatched from London by road and a saving of approximately 12½ per cent in carrier costs has thus been effected. On arrival, the produce was subjected to the strict quality control of a large multiple shop and was found to be up to standard in every

respect. In addition to the saving of carriage costs, the packers calculate an important saving of some 60 per cent container cost per 30 lb. pack—the approximate difference between the cost of the new sack and the cost of the alternative cartons. Such savings are passed on to the consumer, so that they may take advantage of the new pack and thus assist in breaking down any prejudice formerly held that prepacking adds to the cost of the product.

For this important experiment, simple two-ply kraft sacks were used; but when conditions justify their extended usage, Palfsacks can be supplied in up to six plies, also incorporating plies of polythene, Scrimtex reinforced paper, Nevermold, flame resistant or extensible kraft papers.

Packing and Packaging Materials Testing

In addition to moisture vapour permeability and corrosion tests which are carried out for various wrapping papers, in particular, filmic or cellulose wrappings, other materials are tested under conditions of temperature and humidity. Both laboratory and field tests, for example, are carried out with waterproof krafts of the sisal type where bales and packages are actually immersed in water, salt and otherwise for long periods in order to test water penetration. A variety of machines are available for simulating various stresses strains and shocks encountered or likely to be encountered while wrapped and cartoned goods are in transit.

Some reference has been made to the tests carried out by PATRA, and such machines are readily available for tests in connection with specimen bales, parcels, cartons, packing cases and so forth, sent in by their members. Such machines now include tumbling drums, in each revolution of which four normal types of tumbling are reproduced. Such equipment is used in package testing when it is desired to investigate the effects of general rough handling, for example, as is liable to occur during the transit of packages or for comparing the relative merits of returnable containers. Railway shunting conditions are simulated by a small bogey travelling down a predetermined incline plan and being brought to an abrupt halt. Vibration effects of road and air transport are tested on vibrating frequency tables, the table for air transport vibrating at a higher frequency. A spray booth and chambers of controlled humidity and temperature are available for tests on the effects of various atmospheric conditions.

Everyday Tests for Food Wrappings

Paper buyers, users and packagers may desire to carry out simple tests in order to ascertain the suitability of a barrier or functional paper and, in particular, to define the qualities of various types of greaseproof papers. Ready to hand testing of paper samples for such qualities in wrappings as grease resistance, water vapour permeability, odour transmission resistance and inherent odour, are easily and quickly assessed by quite simple methods. Grease resistance may be evaluated by determining the time factor relative to the penetration of a paper sample by lard or turpentine, or by the application of diethyl phthalate which has a viscosity midway between the two. The im-

portant factor of water vapour permeability may be determined by sealing a paper sample over an aluminium dish containing calcium chloride and exposing it to the air at some 70°F., 65 per cent relative humidity. Any degree of moisture passing through the sample of paper is picked up by the desiccant, the percentage being easily ascertained by merely weighing after a suitable period. Odour present in a paper may be detected by enclosing a sample of paper in a closed container with milk chocolate or butter, such food products being quickly affected as a result of off-flavour. Some of the substances which cause odour in a paper are the process water, the slime-killing agents, anti-foaming agents, and oily contaminants. In order to measure or assess odour transmission, a two-compartment closed in the container may be employed, the paper sample itself serving the purpose of a partition separating an odorous substance and an odour-absorbing material, or leakage into the outer container may be recognized merely by smelling.

Testing the Shelf Life of a Paper

Papers of the wrapping or packaging varieties may be made fast to light or non-fugitive. This is important where food products may be exposed to strong sunlight or artificial lighting arrangements in the shop window or store. The

cost is very little extra as compared with coloured papers which fade after exposure.

The furnish and colouring matter from which the paper is made has an influence upon its fading qualities. Medium to high grade wrappings such as friction glazed papers, enamels and chromos will stand up to considerable exposure where the paper has been suitably treated. Tests relative to paper colour fading may be simply made by exposing a sample for some hours in a window, preferably to the sun, and subsequently comparing the sample with the original sheet from which the sample has been taken. The degree of fading may be easily assessed. Most types of paper will fade, even only to a limited degree. Exposed papers also suffer from brittleness, yellowing and some loss in tensile strength. High grade paper made from linen and cotton fibres, and good class sulphites gives the greatest stability in everyday wear and tear and exposure. It is important to use the best paper for wrapping food products compatible with price considerations and what is expected of the paper itself as a barrier, functional paper or some other speciality.

Paper coatings such as waxing, lacquering, impregnating, laminating or cellulose finishing, do much both to enhance the appearance of the paper and render them almost impermeable to water vapour, light exposure, dust and physical damage as a result of frequent handling.

CHAPTER 14

British Standards, Paper and Board Sizes and Qualities, Food Production Figures

THERE is no need to enlarge upon the importance of the part played by the British Standards Institution in formulating standards of materials, their testing and application in the field of both packing and packaging all kinds of merchandise, not the least, the food and allied trades where so many types of paper, board, strapping, sealing and labelling materials are used in conjunction with these two very important aspects of marketing the product.

The B.S.I. have put forward ten reasons why the manufacturer and his executives connected with packing and packaging the product should take advantage of their service:

1. In the factory, standards make for increased efficiency, less waste of men and materials, higher productivity through longer runs.
2. Standards relieve designers and engineers of humdrum routine, allowing them to concentrate all their efforts on creative work.
3. Existence of good standards reduces paper-work in the office, simplifies buying, costing and cataloguing.
4. Standards make for easier stocking in shops, warehouses and factories.
5. Standards are an essential weapon in the battle for higher exports. Britain's voice must be heard in international standards circles. B.S.I. is the link between British industry and the standards requirements of other countries. B.S.I. ensures that world standards do not run counter to British practices.
6. Standards keep pace—and must continue doing so—with the newest industrial advances in electronics, nuclear science and other developments of today and tomorrow. New standards for new projects need constantly to be put in train.
7. Good standards depend on an efficient standards body. We have that body in B.S.I. It is the focal point for Britain's voluntary system of national standards.
8. B.S.I. sells about one million copies of its standards each year, including 250,000 to overseas customers who are buyers in the world's markets.
9. Some 9,000 individuals, firms large and small, public authorities and trade associations contribute directly to the work of B.S.I. Your opposite number or your business competitor is probably already a subscriber.
10. By supporting B.S.I. you will further your own and the national interests; you have a more direct say in standards matters and will help B.S.I. to push ahead with new, important projects.

Air Freight Packaging

In the appropriate chapters, matters of breaking and bursting strengths of tapes and strapping have been discussed and the recommendations of both the B.S.I. and Trade Associations have been outlined for the methods and materials of packing and sealing such containers as fibre-board packing cases and cartons, among other items.

Packaging for air freight and the new labels now employed on consignments have been surveyed and here a reference may suitably be made to leaflet B.S. 1133 Section 20:1959 which deals with the important matter of packaging for transit of goods by air, a method of transport becoming increasingly popular for the speedy and efficient handling of exports. This important leaflet deals with such features as variations of pressure and temperature, paper wrappings, including bags, fibreboard and paperboard containers, wooden and plywood containers, partially packed items, jute sacks and wrappings, multi-wall paper sacks, bales and press bales, liquids, the protection of merchandise against corrosion and spoilage, some general precautions for the carriage of machinery, handling fragile items, the important question of restricted articles (which probably has more reference to the chemical industries), cargoes which are susceptible to variations in temperature, prohibited packaging materials, processes of labelling and marking merchandise, used in conjunction with air freight packing. In a foreword, the B.S.I. points out that the rapidly expanding world-wide demand for transport of goods by air has presented problems peculiar to air carriage, one of which is the need for special packaging. Faulty packaging wastes time, labour and energy and brings about increases in costs. At times, it may too present some hazards to the aircraft, crews or passengers when goods break open as a result of inefficient packing. The new leaflet gives in general terms some guidance on the special considerations pertaining to the packaging of merchandise for conveyance by air. It is not possible to give detailed guidance on the carriage of goods by air that would always apply, it is consequently recommended that each instance should be considered on its merits and that contact with the airline concerned should be established. While in general it is more economical to pack as closely as possible, heavy articles should only be packed in consultation with the airline, and because of possible limitations on the structural strength of floors, etc., it may sometimes be necessary to spread a load.

A special factor in air transport is that allowance has to

be made for atmospheric pressure and temperature variations when packaging liquids and gases.

The safe carriage of goods by air will not necessarily require the amount of materials which might be thought desirable when the same goods are packed for other methods of transport, i.e. sea or land. For various reasons, the bulk and weight of packaging materials should be kept as low as is commensurate with the protection of the contents. Air freights are usually charged on a weight basis and any surplus weight of packaging material will add appreciably to the cost of transport.

Some consideration must be paid to bulk and weight of consignments, as not all airports are at present equipped with mechanical handling devices. It is suggested that bulk pack quantities of small items put into large outers or containers afford better scope for handling.

The subject of good labelling and suitable labels has been dealt with elsewhere but it may again be emphasized that clearly worded labelling is most essential.

Some consideration should be given to the method of sending goods to airports in suitable pallet loads to facilitate ease of transfer. Chapter 16 deals with light mechanical handling devices for the movement of merchandise and includes a survey of pallets and the various types now available to the transport specialist or those responsible for the movement and despatch of packed goods.

In the case of hazardous cargoes, such merchandise can only be accepted if packed strictly in accordance with the International Air Transport Associations (IATA) regulations and advice should be sought before such goods are packed bearing in mind the fact that cargo holds are not necessarily pressurized and that modern cargo carriers operate at high altitudes and can, on trans-continental journeys, be subjected to extremes of temperatures and humidity. Due to the various types of aircraft used in transport, height of flight and other considerations, goods in transit may be subjected to extensive variations of temperature and external pressure. When sealed air-tight packaging is used, it is preferable for as much air as possible to be exhausted before the final sealing is completed as this avoids the risk of the packaging or sealing bursting open during the flight. It has been found that lightly constructed cylindrical metal or composites fail under internal pressure, usually at the top and bottom, and for this reason corrugated top and bottoms are recommended. Temperatures in the holds of some aircraft tend to drop considerably, depending upon the duration and height of the flight, yet on the ground, particularly in tropical countries, very high temperatures rapidly build up, and certain wrapping materials can effect the goods inside them under such conditions. For example, above certain temperatures, the bituminous compound used to bond kraft union waterproof paper may bleed through the paper and thus soil the contents of the pack. Care should be exercised when choosing wrappers and containers to avoid the risk of spoilage arising because of these characteristics of air transport. Carriers should be informed when goods are required to be kept at specific temperatures and, whenever possible, the carriers will meet such requirements.

Chapter 13 deals with waterproof wrappings and among the papers surveyed may be found the advice required concerning the choice and application of a specialized wrapper. The question of cushioning or strengthening materials is important and the outer wrapper in particular should be equal to handling and be durable. Water-resistant outer wrappers are most important for certain countries and at various times of the year. Goods are liable to damage by water-vapour and such merchandise should be enveloped in wrappers with as low a water-vapour transmission rate as possible, always bearing in mind the possibility of a trans-shipment to other forms of transport. Methods of bales and package sealing are amply dealt with elsewhere in this book.

Air Freight in Fibreboard and Paperboard Cases

For general use as outer containers, particularly if the goods are to a large extent a self-supporting load, are the fibreboard packing cases, drums, etc., outlined in Chapter 8. These are extremely satisfactory, provided that they are sufficiently robust in their make up to withstand handling without bursting open. The methods of sealing container flaps with adhesive, wire stitches, staples, and adhesive tapes are fully outlined in this book and should be selected as a result of field tests. Where there may be some danger of sifting or seepage, the outers should be overwrapped and the joints of the outer wrapping sealed. Paperboard cartons and boxes are quite satisfactory for certain goods, provided that they are of adequate strength and caliper, but unless made up from high wet strength board it is preferable that they should be over-wrapped with a water-resistant wrapping. The use of printed glued tapes or self-adhesive tapes renders pilfering from sealed cases more difficult as the breakage in seal is immediately recognized.

Many items, because of their weight, shape and bulk, should be packed in wooden or plywood cases. They should be so constructed that the base will support the packed load adequately and so that the case can be loaded and unloaded a number of times either by hand or by mechanical means without damage or distortion. From the standpoint of storage, aircraft operators prefer cases with smooth and unbroken surfaces, but such cases present loading difficulties when fork lift trucks are employed, whereas the conventional type of B/E/R (battened-ends-and-round) case fitted with fork lift battens is more easily handled. Furthermore the provision of smooth, unbroken faces inside the case is an advantage when packing quantities of similar items, and due regard should be made to those features when making a choice. Tensional steel strapping is recommended for this type of case closure. Generally speaking, cases constructed entirely of ply or of a combination of ply and softwood battens, are preferable because of the high strength/weight ratio of plywood. Crates also have an application in packing foods for air freight; adequate protection of certain fragile goods being afforded by the provision of a suitable crate. Such crates may be either of completely open construction or may be provided with a solid framed base and in some instances, a close boarded top. Weight and costs may be saved where such crates can be used in packing merchandise

and they certainly give the operators an opportunity of seeing packed items inside the crate and thereby handling the consignment with the necessary care.

Multi-Wall Paper Sacks.—These strong paper sacks are now popularly used for packing powders, granular substances, animal feedingstuffs, foods and vegetables, etc., and are acceptable by airlines provided they are constructed of material possessing adequate bursting strength. The sacking and wrapping of soft goods is also acceptable for air transport provided the seals and ties are properly made. Identification should be made by tie-on tags suitably addressed. Jute sacks may be used for granular substances, provided that the sacks are of close weave, or alternatively they are paper or plastic lined or the contents first packed in a separate plastic or paper liner.

Bales and press bales are perfectly satisfactory provided they are adequately labelled and marked in the usual way. If there is any likelihood of deterioration or damage to the contents from dampness, a water-resistant barrier wrap should be interposed between the contents and the jute baling. Unpressed bales should be properly and securely stitched with baling twine and pressed bales should be secured with tensional steel strapping with the strapping cut off close and well flattened.

Liquids are susceptible to changes in temperature and most of them expand when the temperature rises. All containers should therefore be provided with adequate ullage or vacuit, which will not normally exceed 10 per cent. As the pressure differential rises as altitude increases, and may amount to over 3 lb./sq. in. (0.2 kg./cm²) the strength of the container and its closure must be very carefully checked, as a perfectly effective container and closure at sea level pressure may be quite inadequate in a high flying aircraft. Glass or stoneware containers should be packed to allow for suitable absorbent material round them so that should the container be damaged, the packing will be capable of absorbing the contents when necessary. The absorbents used should bear some relationship to the contents involved.

Fragile Items.—These receive special attention when suitably marked and the appropriate label used as outlined in Chapter 3. The question of vibration must be taken into account as this can be considerable in take off of an aircraft. Some form of anti-vibration or shock absorbing material or method should be employed in packing to avoid possible breakage. The facilities available for maintaining a required temperature level vary according to the aircraft and the route flown. Refrigeration is not generally available and commodities which should be kept at a constant low temperature should be packed, surrounded with appropriate coolant, within an insulated container or a vacuum flask. Most carriers will make arrangements to replace ice *en route*. Highly perishable foodstuffs, such as fresh or frozen meat, fish, butter, cooked hams or fats should be packed in hermetically sealed containers. Labelling fragile, perishable and similar foodstuffs has been discussed elsewhere with the appropriate information relative to specially designed labels and addressing.

New Standard Glossary of Packaging Terms

Produced by the British Standards Institution under B.S. 3130:1959, a new and up-to-date glossary of packaging terms has been compiled for the use of the packer and the packager of all kinds of merchandise.

Packagers and packers in the food, wines, spirits and beverage industries are considerable users of all kinds of basic materials used for packaging which includes glass, film, polythene, plastic, paper, board and many other materials. It is important that those who purchase both packaging and packing material should see that the users fully understand their application, limitations and forms of usage. This new glossary of packaging terms does much to simplify packaging processes in general.

The fully indexed 105 page book contains many hundreds of definitions which have been drafted in the simplest form consistent with reasonable accuracy.

Its appearance is timely, for in recent years it has become increasingly apparent that much confusion exists regarding the terminology used by those concerned with packaging. 'Newcomers to this field of activity,' states the Foreword, 'are often faced with real difficulties because of the lack of agreed definitions of the trade terms which they meet. Even experienced packers are often misled when they encounter terms relating to types of containers which they have not previously used.'

The terms and definitions in the glossary are arranged under 16 main headings:

1. General.
2. Adhesives and adhesive tapes.
3. Basketry.
4. Cordage.
5. Corrosion prevention.
6. Cushioning materials.
7. Films, foils and flexible laminates.
8. Glass containers and closures.
9. Metal.
10. Methods of wrapping.
11. Nails, screws and rivets.
12. Paper and board wrappers and containers.
13. Plastics.
14. Spoilage by micro-organisms, insects and mites.
15. Textiles.
16. Wooden containers.

The average length of the definitions is 25 words—a testimony to the thoroughness of the work undertaken in preparing and editing this large and comprehensive work.

Many of the terms in the glossary have been the subject of controversy for years and some arbitrary decisions have been taken in defining them.

The reader may consider the glossary is defective because of the omission of the proprietary names by which many packaging materials are known. The reason for this is that many proprietary brands have become so widely known that they are sometimes regarded as being generic names; they are not, however, and all proprietary names have been omitted from the glossary in accordance with B.S.I.'s usual policy.

This valuable glossary is very much a 'pioneer effort' and B.S.I. anticipates that there will be many suggestions for improvements. They will be recorded for possible use in a future revision.

Copies of this glossary may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1. Price 20s. (Postage will be charged extra to non-subscribers.)

Here are some extracts which have a special reference to the food and beverage industries.

Section 1 General is quoted by courtesy of B.S.I. as it has a special reference to important definitions in packing and packaging which have long been, in some cases, somewhat ambiguous.

| <i>Term</i> | <i>Definition</i> |
|-------------------------|--|
| Packaging | The art of and the operations involved in the preparation of articles or commodities for carriage, storage and delivery to the consumer. |
| Packing | The operations of packaging by which articles or commodities are enveloped in wrapping and/or enclosed in containers or otherwise secured (see also float packing, suspension packing). |
| Pre-packing | The operation of packing articles or commodities in wrappers or containers ready for sale by a retailer, normally before delivery to him. |
| Identification | The application of appropriate markings to ensure that the identity of an article or commodity is unfailingly indicated after preservation and each stage of packing. |
| Marking | The process of applying to the container such particulars of (a) destination, consignee and special transportation marks, (b) consignor, (c) quantity, (d) nomenclature, (e) package number, (f) invoice or other document details, as may be necessary. |
| Preservation | The application of a suitable preservative, after cleaning, where necessary, to maintain an article in the required condition. |
| Preservative | A substance used to prevent deterioration. |
| Package, pack or packet | The product of a complete series of packaging operations or a unit consisting of a number of such products. |
| Closure | The means of keeping a package closed. |
| Sealing | A method of providing additional security to a wrapping or container with the object of retaining the contents and protecting them against factors causing deterioration or loss. |
| Suspension packing | A method of packing where, by the attachment of springing devices, an article is suspended in a container, or an inner container in an outer. |
| Float packing | The method of employing an inner and outer container with suitable cushioning |

| <i>Term</i> | <i>Definition</i> |
|--------------------------------|---|
| Cushioning Material | material between the two to absorb mechanical shock. The material applied to mitigate shock and/or to protect surfaces from abrasion and/or to position an article in a container. |
| Container | Any receptacle which holds, restrains or encloses any article or commodity or articles or commodities to be stored or transported.* |
| Drum | 1. A straight-sided, normally cylindrical container of metal, plywood, or fibre-board. 2. A cylindrical flanged container, having flanges and barrel normally constructed from cut timbers, and assembled with bolts and nails, and usually of flange diameter exceeding 15 in. Drums of less than 15 in. diameter are usually called reels. |
| Reel | 1. A cylindrical flanged container which may be either of one-piece construction (e.g. moulded or turned from the solid), or fabricated from ready-made parts, including one-piece flanges. A reel will not usually exceed 15 in. flange diameter. 2. A continuous sheet of paper or board wound on a core. |
| Bottle | A narrow-necked container, usually of glass, stoneware or plastics. |
| Jar | A wide-mouthed container, usually of glass, stoneware or plastics. |
| Composite container Lamination | A container which employs different materials for its main structural members. The process of combining the complete surfaces of two or more sheet materials of the same or different nature. |
| Laminate Ply | The product of lamination. 1. One component of a laminate. 2. Any one of the layers forming the walls of a bag or sack. |
| Barrier | Material providing a physical shield against loss or deterioration. |
| Over-wrap | A complete wrapping over one or more packs. |
| Gauge | The expression of thickness of certain materials. |
| Pallet | A portable platform with or without superstructure for the assembly of a quantity of goods to form a unit load for handling and stacking by mechanical appliances, particularly pallet trucks and fork trucks. |
| Box pallet | A pallet having a superstructure of at least three fixed, removable or collapsible sides. |

*Attention is drawn to the fact that the word 'container' often has a different meaning in the field of transportation.

| Term | Definition |
|---------------------------------------|--|
| Stillage | A portable platform with or without superstructure for the assembly of a quantity of goods; it has legs or bearers (and sometimes wheels at one end) to allow an elevating truck to enter and raise it off the ground sufficiently for transporting. |
| Inflammable* | Having a flash point between 73°F. and 150°F. (22·8°C. and 65·6°C.). |
| High inflammable* | Having a flash point below 73°F. (22·8°C.). |
| Shelf Life Package Life | The length of time during which a package and its contents do not deteriorate under expected conditions of storage and display. |
| Waterproof | Offering high resistance to the passage or absorption of liquid water. |
| Water vapour-proof | Offering high resistance to the passage of water vapour. |
| Moisture content | The weight of moisture held by a material. NOTE. The moisture content may be expressed as a percentage either of the moisture-free weight or of the weight at the commencement of the test. The method of expression must be stated. |
| Relative humidity | The ratio of the absolute humidity of the air to that of air saturated with water vapour and at the same pressure and temperature. NOTE. The ratio is usually expressed as a percentage. At ordinary atmospheric temperatures this ratio is almost exactly equal to the ratio of the actual vapour pressure to the saturation vapour pressure at the same (dry-bulb) temperature. |
| Equilibrium humidity | The relative humidity of an atmosphere which would not tend either to add or to subtract moisture from a given material with a given moisture content. |
| Equilibrium moisture content | The moisture content of a moisture sensitive material when it neither gains nor loses water whilst exposed to an atmosphere of given relative humidity. |
| Permeability to water-vapour (W.V.P.) | The weight of water vapour in grammes passing through one square metre of material per 24 hours under specified conditions. |
| Vapour pressure | The pressure exerted by a vapour at a given temperature. In connection with packaging, usually refers to the partial pressure exerted by water vapour in an atmosphere at a given temperature. |
| Saturated vapour pressure | The partial pressure exerted at a given temperature by the vapour of a liquid in the presence of that liquid. In connection |

| Term | Definition |
|------|--|
| | with packaging, usually refers to the maximum possible partial pressure of water vapour in an atmosphere at a given temperature. |

Section 8 deals with glass containers and closures and the definitions given for the fundamental materials, sizes, application and other detail have a general interest to all packagers in glass containers.

| | |
|------------------------------|--|
| Glass | An inorganic substance in a condition which is continuous with and analogous to the liquid state but which, as a result of having been cooled from a fused condition, has attained so high a degree of viscosity as to be rigid. |
| Amber glass | Brown coloured glass with light-excluding properties, varying in shade with different makes between a light yellowish brown and a deep reddish brown. The colouring agents usually employed are (a) carbon-sulphur or (b) iron-manganese. |
| Blue glass | Glass made by introducing cobalt oxide into the batch, the extent to which this is done controlling the tint. |
| Actinic green glass | Emerald green coloured glass with special light-excluding properties. |
| Dark green glass | Glass in which the colour may vary from bluish green to yellowish green, according to the proportions of iron oxide and manganese dioxide in the batch, and also to the furnace atmosphere. Such glass is used mainly for beer and wine bottles. |
| Opal glass | Opaque or semi-translucent glass, normally white. |
| Pale glass | Glass having a light green shade. |
| White flint glass (or flint) | A term applied to colourless glass. |
| Borosilicate glass | Silicate glass containing boric oxide (B_2O_3). |
| Chemically resistant glass | Glass of high chemical durability. |
| Neutral glass | A glass which passes the British Pharmacopeia or British Standard test for limit of alkalinity (B.S. 795, 'Ampoules'). |
| Blown glass | Glassware shaped by air pressure. |
| Pressed glass | Glassware formed by pressure between a mould and a plunger. |
| Carboy | A large container normally used for transporting acids. |
| Demijohn | A bottle, usually wicker-covered, with a capacity of from 2-12 gallons. |
| Winchester | A term applied to round, narrow or wide-mouth bottles usually used for the distribution of chemicals or pharmaceutical products (Galenicals). |
| Corbyn | A container normally of 48 fluid ounces |

*In order to avoid any possible ambiguity, it is the Institution's policy to encourage the use of the terms 'flammable' and 'non-flammable' rather than 'inflammable' and 'non-inflammable'. The above terms are defined above solely because certain statutory regulations require their use on packages.

| <i>Term</i> | <i>Definition</i> | <i>Term</i> | <i>Definition</i> |
|-------------------|---|-----------------------|---|
| | capacity, i.e. one imperial quart, and usually confined to the drug trade. | Expansion space | The space in a filled glass container between the liquid and the bottom of the closure. |
| Ampoule | A container which after filling is sealed by fusing the glass neck, usually in capacities up to 100 ml.; made from glass tubing. | Air space | |
| | | Gas space | |
| | | Bulk test | |
| Cartridge | A medical injection container, cylindrical in shape, designed for use in a special syringe. | | A test in which the capacity of glass containers is determined not with reference to a single container not on the average of a representative sample batch. |
| Tubular container | A container made from glass tubing. | Reputed sizes | The normal bottle of wine should contain $\frac{1}{6}$ of a gallon = 26 $\frac{2}{3}$ oz. and is known as a 'reputed quart'. The 'reputed pint' is a half bottle and is therefore $\frac{1}{2}$ of a gallon = 13 $\frac{1}{2}$ oz. Similarly the 'reputed half pint' is $\frac{1}{24}$ of a gallon = 6 $\frac{2}{3}$ oz. Variants of the above are known as 'mock quarts' or 'mock pints' and may be of less capacity. For example a 'mock pint' may be 13 or 13 $\frac{1}{2}$ to the gallon. |
| Vial) | A small glass bottle for medicines, etc. | | |
| Phial) | | | |
| Medical | A transparent glass with a slight shade of blue, formerly used for medicine bottles, winchesters, etc. | | |
| Nebuchadnezzar | A wine bottle—capacity 20 reputed quarts. | | |
| Belshazzar | A wine bottle—capacity 16 reputed quarts. | Finish | The top part of the neck of a container made to accommodate the closure. |
| Salmanazar | A wine bottle—capacity 12 reputed quarts. | External screw finish | A finish designed to accommodate a closure which is applied by means of an internal screw thread. |
| Methuselah | A wine bottle—capacity 9 reputed quarts. | Internal screw finish | A finish designed to accommodate a closure applied by means of an external thread. |
| Rehoboam | A wine bottle—capacity 6 reputed quarts. | | |
| Jeroboam | A wine bottle—capacity 4 reputed quarts. | Cork mouth finish | A finish designed to accommodate a cork or bung as the closure of a bottle. |
| Tappit hen | A wine bottle usually of a capacity of 3 imperial quarts. | Neck | The part of a container between the finish and the shoulder. |
| Magnum | A wine bottle—capacity 2 reputed quarts. | Neck ring | The mould portion used to form the neck or top of a glass container. |
| Siphon | A container for aerated water operated by a siphon attachment, the glass part being known as a 'siphon vase'. | Bore | The mouth or entrance either to the full length of the neck or to part only, covering dimensions are necessary for corking, filling tube sizes and internal fittings. |
| Split | A bottle used mainly for mineral waters, usually with an average capacity of 6 $\frac{3}{4}$ fl. oz. | | NOTE. Bore dimensions are usually specified as a minimum. Close tolerances for the full length of neck cannot be guaranteed. |
| Canon | A plain round bottle of comparatively heavy weight usually required in $\frac{1}{2}$, 1 or 2 oz. capacity; used mainly in the flavouring essence trade. | Choke | A constriction in the bore. |
| Codd's | A bottle designed by Hiram Codd, in which the closure is effected by a glass marble imprisoned in the neck of the bottle. | Distribution | The relative thickness of glass in the various parts of a container. |
| Enamelled | A bottle or jar which is labelled or decorated by vitreous enamelling. | Insweep | An inward curved or tapered portion of a glass container which joins the lower part of the sides to the base. |
| Capacity | The content given either in fluid ounces or metric liquid units. | Murgatroyd belt | The portion of the side wall of a bottle which is near the bottom. |
| Filling point | The point at which when filled a container holds its nominal capacity—usually verified by a bulk test. | Punt | The base on which a container stands. |
| Vacuity | The expansion space left in a container between the top level of the contained liquid and the lowest limit of the affixed closure. This space may be expressed conveniently as a percentage of the volume of liquid in the container at the time and temperature of filling. (It is essential that the correct vacuity be determined for each separate product to be sealed.) | Pushed punt | A punt having a deep cavity as in the case of a champagne bottle. |
| | | Fire-finish | A method of improving the sealing surface of a glass container by heating in a fire or flame. |
| | | Blank Parison | A preliminary shape from which a finished glass article is further formed. |

| <i>Term</i> | <i>Definition</i> |
|------------------------|--|
| Mould | The metal form in which molten glass is shaped. |
| Blow mould | The mould in which a blown glass article is finally shaped. |
| Cavity | The part of the mould in which a glass container is blown. |
| Bottom plate | That part of the finishing mould which forms the base of a container, and on which may be engraved identification marks. |
| Blow-and-blow process | The method of making a glass container in which, after the ring has been formed, the body of the container is formed by two successive blowing operations. |
| Press-and-blow process | A process of glass container manufacture which involves first pressing and then blowing. |
| Refining | That part of the melting process in which molten glass nears freedom from gaseous inclusions. |
| Anneal | To remove strains in glassware by maintaining the latter at suitable temperature, and subsequently cooling at a controlled rate. |
| Lehr (annealing oven) | A long, tunnel-shaped oven for annealing glass by continuous passage. |
| Campaign | The period during which a tank furnace produces glass from one rebuild to the next. |
| Cullet | Broken glass containers, etc., which in suitable quality, are used as a material in melting new glass. |
| Alkalis | The hydroxides and carbonates of sodium, potassium and lithium. |
| Mould mark (Seam) | Mark on a glass surface resulting from the junction of the mould parts. |
| Baffle mark | A mark or seam on a glass container resulting from a mould joint between the blank mould and the baffle plate. |
| Crizzle | Fine fractures on the surface of a glass container. |
| Bloom | A surface film on a glass container (1) produced during the annealing process (2) resulting from atmospheric attack. |

British Standard Tests for Burst Strength

Based on the work of the Technical Section of the British Paper & Board Makers' Association, a new British Standard (B.S.3137:1959) is concerned with the methods to be employed in determining the bursting strength of paper. This describes known pneumatic and hydraulic testing apparatus, with instructions as to their usage and readings, and specifies methods of reporting the results thus obtained. Both British and German studies appear to have run parallel, judging by the Bad Homburg conference, as the new British Standard is an attempt to counter the variations in results that have occurred in the past by specifying certain

details of the instruments used with greater precision. In pneumatic testing, for example, the clamp, diaphragm, reservoir and connecting pipes are all specified in many detailed respects. Amply illustrated, the Standard concludes with appendices dealing separately with gauge calibration, gauge pointer constants, gauge hydraulic constants and precision results.

Functional and Artistic Requirements of Packaging Materials

From the packager's point of view, matters concerning moisture vapour permeability and corrosion of wrapping materials are of paramount importance but as tests are carried out on all kinds of materials such as films, foils and laminates under controlled conditions of temperature and humidity this aspect of barrier qualities of paper is left in the hands of the expert paper specialist. The packager has also to consider the consumer's reaction to packaging, in particular the housewife who has come to appreciate good presentation, design and style and this brings in both function and artistry. These two additional important factors must be borne in mind by the package designer and specialist and the packager himself. Some of these factors are outlined in Chapter 4 dealing with aluminium foils and laminates, and their artistic and functional properties from the standpoint of the retailer who displays and sells the goods to the housewife who buys and uses them in the home. Here are some additional fundamentals relative to these two factors which may be considered as the cornerstone to better and brighter packaging.

- (a) Ample protection is the first consideration and where products of a hygroscopic nature are concerned this is all important. Some food products are used in small portions and the remaining quantity must be fully protected from drying out, becoming rank, or deteriorating in some way. From the filled container right down to the final vestige, the packaged contents of a container must be fully protected in every way. Protection may be from physical damage or from moisture vapour.
- (b) Ease of usage or application is important and packs with patent pourers or dispensers, spouts or funnels are worthy of consideration for powders or granulated items. The after-use appeal of the pack, has special application in some instances. Ease of opening too is important.
- (c) From the retailer's point of view, the pack should be capable of display as a unit or in mass form giving a harmonious composition in each event. The housewife may purchase several cans or packs in advance and good and convenient storage is important.
- (d) In the case of foodstuffs, they must be fully protected from outside odours as a result of contact with other products. The prevention of flavour and colour loss where they apply is important.
- (e) The label should carry the name of the product and the brand mark, while a small subsidiary label may carry recipes, hints on usage, size, weight, composition

of contents where applicable, conditions of storage, and so forth.

- (f) The pack must have eye appeal together with convenience of form and style. The price must not be in excess of standard due to a superior form of packaging—some other way must be found to offset new methods of presentation of the product. The package both sells and protects the contents.

New facilities, included in the modern pack, must be reflected in additional price in the finished pack. In times of prosperity or where the goods are purchased for a gift, price is not a dominating factor however. Nevertheless, first class packaging must be coupled with first class goods and while one may sell a new product initially, only good goods will sell a second time. Convenience of package is also important and many aspects of this important factor come into the picture. It must display or stand well in the store or on the counter. The convenience of the shopper must not be forgotten and the shopping bag should not be overloaded with awkward shaped packages which could have been presented in a more suitable form.

In the six points outlined concerning the function and artistry of packaging, no mention has been made of hygiene, but this has been emphasized throughout this survey of food presentation. The material used must function as a hygienic wrapping and at the same time be printable, attractive, protective, mouldable, and act as a barrier against light, damp, heat, odour and other undesirable factors.

Paper and Board Sizes—Weights and Qualities

Packers, packagers, printers, stationers, paper buyers and others concerned in the use and application of paper and board materials will find the following tables of paper and board sizes and other details of value. Both size and name should be specified as certain variations apply in various parts of the country. The system of naming sizes and weights of paper and board material is somewhat complicated as varying sizes and weights are fixed for a quality. In the case of wrapping, sizes have no universal application. English sizes or their names centre around some 15 titles, six of these being basic sizes. Each descriptive name has a large number of combinations by adding the prefix of Single or Half, Double or Quad, Small or Large, Extra or Super, Long or Broad, Pinched or Reduced, Middle or Whole. Then there are other combinations and these are quoted as Double/Quad, Double/Small, Extra/Large among other descriptions of size. Most of these examples are shown in the list of sizes and weights of various types of paper and board. The popular sizes of English papers are based upon Foolscap, Demy, Medium, Crown, Royal, Imperial, Post, Hand, Pott, Elephant, Emperor, Antiquarian, Atlas, Eagle, and Columbier. Here are the sizes and weights of standard writings, printings, envelopes, boards, covers, label papers, equivalent weights as obtained on the slide ruler, some notes on International Standardization of Paper Sizes, Strawboards and other types of boards used in packing, packaging and display work, details of Browns and Wrappings and other information. An outline of envelope sizes

is given as a result of the growing tendency to package powders and granulated materials in some form of wallet, satchel or envelope made up from filmic material, paper, waxed based papers, metal foils, aluminium laminate and other materials now used in the packaging of suitable products.

Standard Sizes of Paper

Papers—Writings

| | | | |
|--------------------|---------------|--------------------|---------------|
| Small Foolscap .. | 13½ × 16½ in. | Sheet and ½ Cap .. | 13½ × 25½ in. |
| Small Post .. | 14½ × 18½ in. | Small Demy .. | 15½ × 20 in. |
| Sheet and ½ Cap .. | 13½ × 22½ in. | Large Post .. | 16½ × 21 in. |
| Small Medium .. | 17½ × 22 in. | Super Royal .. | 19 × 27 in. |
| Medium .. | 18 × 23 in. | Imperial .. | 22 × 30 in. |
| Small Royal .. | 19 × 24 in. | | |

Printings

| | | | |
|-------------------|---------------|----------------|--------------|
| Large Foolscap .. | 13½ × 17 in. | Medium .. | 18 × 23 in. |
| Crown .. | 15 × 20 in. | Royal .. | 20 × 25 in. |
| Large Post .. | 16½ × 21 in. | Large Royal .. | 20½ × 27 in. |
| Demy .. | 17½ × 22½ in. | Imperial .. | 22 × 30 in. |

Cover Papers

| | | | |
|-----------------|---------------|--------------|---------------|
| Cover Medium .. | 18½ × 23½ in. | Cover Double | |
| Cover Royal .. | 20½ × 25½ in. | Crown .. | 20½ × 30½ in. |

Drawing Cartridges

| | | | |
|-------------|-------------|------------------|-------------|
| Imperial .. | 22 × 30 in. | Elephant, Double | 27 × 40 in. |
|-------------|-------------|------------------|-------------|

Boards

| | | | |
|-------------|---------------|-------------------|---------------|
| Royal .. | 20 × 25 in. | Large Imperial .. | 22½ × 32 in. |
| Postal .. | 22½ × 28½ in. | Index .. | 25½ × 30½ in. |
| Imperial .. | 22½ × 30 in. | | |

All double and quad sizes are exact multiples of the standard sizes.

WRITINGS and PRINTINGS

(For Official and Similar Publications)

| | | | |
|-----------------------|--------------|-----------------------------|---------------|
| Copy .. | 16½ × 20 in. | Columbier .. | 24 × 34½ in. |
| Copy (Double) .. | 20 × 33 in. | Foolscap (Quad 1½ Sheet) .. | 34 × 40½ in. |
| Super Royal .. | 19 × 27 in. | Pinched Post .. | 14½ × 18½ in. |
| Pott (Quad) .. | 25 × 32 in. | Pinched Post (Double) .. | 18½ × 29 in. |
| Pott (Quad Double) .. | 32 × 50 in. | Small Post .. | 14½ × 18 in. |
| Antiquarian .. | 30 × 53 in. | Small Post (Double) .. | 18 × 29 in. |
| Atlas .. | 26½ × 34 in. | | |

EQUIVALENT WEIGHTS

GRAMMES PER SQUARE METRE—LB. PER REAM

The figures mentioned below are exactly worked out on basis of 1 lb.—4536 kg.

| Grammes per Square Metre | Lb. per Ream of 480 Sheets, 20 × 30 in. | Grammes per Square Metre | Lb. per Ream of 480 Sheets, 20 × 30 in. |
|--------------------------|---|--------------------------|---|
| 1 | 0.41 | 19 | 7.78 |
| 2 | 0.82 | 20 | 8.19 |
| 3 | 1.23 | 21 | 8.60 |
| 4 | 1.64 | 22 | 9.01 |
| 5 | 2.05 | 23 | 9.42 |
| 6 | 2.46 | 24 | 9.83 |
| 7 | 2.87 | 25 | 10.24 |
| 8 | 3.28 | 26 | 10.65 |
| 9 | 3.69 | 27 | 11.06 |
| 10 | 4.10 | 28 | 11.47 |
| 11 | 4.51 | 29 | 11.88 |
| 12 | 4.92 | 30 | 12.29 |
| 13 | 5.32 | 31 | 12.70 |
| 14 | 5.73 | 32 | 13.11 |
| 15 | 6.14 | 33 | 13.52 |
| 16 | 6.55 | 34 | 13.93 |
| 17 | 6.96 | 35 | 14.34 |
| 18 | 7.37 | 36 | 14.75 |

THE PACKAGING OF FOOD AND BEVERAGES

| Grammes per Square Metre | Lb. per Ream of 480 Sheets, 20 × 30 in. | Grammes per Square Metre | Lb. per Ream of 480 Sheets, 20 × 30 in. | Grammes per Square Metre | Lb. per Ream of 480 Sheets, 20 × 30 in. | Grammes per Square Metre | Lb. per Ream of 480 Sheets, 20 × 30 in. |
|--------------------------------|---|--------------------------------|---|--------------------------------|---|--------------------------------|---|
| 37 | 15.16 | 53 | 21.71 | 69 | 28.26 | 85 | 34.82 |
| 38 | 15.56 | 54 | 22.12 | 70 | 28.67 | 86 | 35.23 |
| 39 | 15.97 | 55 | 22.53 | 71 | 29.08 | 87 | 35.64 |
| 40 | 16.38 | 56 | 22.94 | 72 | 29.49 | 88 | 36.04 |
| 41 | 16.79 | 57 | 23.35 | 73 | 29.90 | 89 | 36.45 |
| 42 | 17.20 | 58 | 23.76 | 74 | 30.31 | 90 | 36.86 |
| 43 | 17.61 | 59 | 24.17 | 75 | 30.72 | 91 | 37.27 |
| 44 | 18.02 | 60 | 24.58 | 76 | 31.13 | 92 | 37.68 |
| 45 | 18.43 | 61 | 24.99 | 77 | 31.54 | 93 | 38.09 |
| 46 | 18.84 | 62 | 25.40 | 78 | 31.95 | 94 | 38.50 |
| 47 | 19.25 | 63 | 25.80 | 79 | 32.36 | 95 | 38.91 |
| 48 | 19.66 | 64 | 26.21 | 80 | 32.77 | 96 | 39.32 |
| 49 | 20.07 | 65 | 26.62 | 81 | 33.18 | 97 | 39.73 |
| 50 | 20.48 | 66 | 27.03 | 82 | 33.59 | 98 | 40.14 |
| 51 | 20.89 | 67 | 27.44 | 83 | 34.00 | 99 | 40.55 |
| 52 | 21.30 | 68 | 27.85 | 84 | 34.41 | 100 | 40.96 |

Appendix

NOTES ON INTERNATIONAL STANDARDIZATION OF PAPER SIZES

A committee of the International Organization for Standardization (ISO) is considering the standardization of paper sizes on an international basis. Definite decisions have not yet been reached, but it is considered highly probable that the sizes known in many countries as the 'A' series will form at least part of the international agreement on this subject. These sizes are already in use for certain purposes in the United Kingdom and are widely used in many other countries. The basic size is equivalent to one square metre, the other sizes being obtained by a process of doubling or halving; moreover, the sheets all have the same proportions.

While this British Standard deals only with mill sizes of paper and boards it is felt that it will be of assistance to manufacturers and users to have details of the full range of sizes. These are, therefore, given in the Table below, which also gives the equivalent measurements in British units to the nearest half inch.

'A' SERIES—PAPER SIZES

| Designation | Size | |
|-------------|-------------|-----------|
| | millimetres | inches |
| 4 A 0 | 1682 × 2378 | 66 × 93½† |
| 2 A 0 | 1189 × 1682 | 47 × 66 |
| A 0 | 841 × 1189* | 33 × 47 |
| A 1 | 594 × 841 | 23½ × 33 |
| A 2 | 420 × 594 | 16½ × 23½ |
| A 3 | 297 × 420 | 11½ × 16½ |
| A 4 | 210 × 297 | 8½ × 11½† |
| A 5 | 148 × 210 | 6 × 8½ |
| A 6 | 105 × 148 | 4 × 6 |
| A 7 | 74 × 105 | 3 × 4 |
| A 8 | 52 × 74 | 2 × 3 |
| A 9 | 37 × 52 | 1½ × 2 |
| A 10 | 26 × 37 | 1 × 1½ |

*1 sq. m.

†As altered August, 1951.

TABLE OF REAMS TO THE TON
(To the Nearest Quarter of a Ream)

| Ream Weight in lb. | No. in ton | Ream Weight in lb. | No. in ton | Ream Weight in lb. | No. in ton |
|--------------------------|---------------|--------------------------|---------------|--------------------------|---------------|
| 5 | 448 | 21 | 106½ | 37 | 60½ |
| 6 | 373½ | 22 | 101½ | 38 | 59 |
| 7 | 320 | 23 | 97½ | 39 | 57½ |
| 8 | 280 | 24 | 93½ | 40 | 56 |
| 9 | 249 | 25 | 89½ | 41 | 54½ |
| 10 | 224 | 26 | 86½ | 42 | 53½ |
| 11 | 203½ | 27 | 83 | 43 | 52 |
| 12 | 186½ | 28 | 80 | 44 | 51 |
| 13 | 172½ | 29 | 77½ | 45 | 49½ |
| 14 | 160 | 30 | 74½ | 46 | 48½ |
| 15 | 149½ | 31 | 72½ | 47 | 47½ |
| 16 | 140 | 32 | 70 | 48 | 46½ |
| 17 | 131½ | 33 | 68 | 49 | 45½ |
| 18 | 124½ | 34 | 66 | 50 | 44½ |
| 19 | 118 | 35 | 64 | 51 | 44 |
| 20 | 112 | 36 | 62½ | 52 | 43 |

ENVELOPE SIZES

| Small Pockets | Court and Card Bankers | Commercial Bankers |
|------------------|---------------------------|--------------------|
| in. | in. | in. |
| 2½ × 2½ | 3½ × 4½ | 3½ × 5½ |
| 3½ × 3½ | 4 × 6 | 3½ × 5½ |
| 3½ × 2½ | 4½ × 5½ | 3½ × 6 |
| 3½ × 2½ | 4½ × 6½ | 3½ × 6 |
| 4 × 3 | 4½ × 4½ | 3½ × 8½ |
| 4½ × 2½ | 5 × 6½ | 3½ × 6½ |
| 4½ × 2½ | 5 × 7½ | 4 × 9 |
| 5½ × 3½ | 5½ × 8½ | — |
| 6 × 4 | 6 × 9 | — |
| Official Pockets | Catalogue Pockets | |
| in. | in. | in. |
| 9 × 4 | 6½ × 5 | 7½ × 5 |
| 9½ × 4½ | 8½ × 5½ | 9 × 6 |
| 10½ × 4½ | 9½ × 6½ | 10 × 7 |
| 11 × 5 | 10½ × 8½ | 12 × 10 |
| 12 × 5 | 14 × 9 | 15 × 10 |
| 14 × 5½ | — | — |
| 15 × 6 | — | — |

SIZES OF COMMERCIAL ENVELOPES

| | Inches |
|------------------------------|----------|
| Commercial | 6 × 3½ |
| Double Large Card | 6½ × 4½ |
| Post Card | 6 × 4 |
| " " | 6½ × 4 |
| Foolscap | 8½ × 4 |
| Large Foolscap | 9 × 4 |
| Extra Large Foolscap | 9½ × 4½ |
| Draft | 10½ × 4½ |
| Prospectus | 11 × 5 |
| Large Draft | 12 × 5 |
| Brief | 14½ × 5 |
| Cabinet | 7½ × 5½ |
| Small Deed | 10 × 9 |
| Deed | 12 × 9 |
| Large Deed | 12 × 10 |
| Large Card | 4½ × 3 |
| Double Small Card | 5 × 3 |

ARABIC AND ROMAN NUMBERS

| | | |
|--------------|----------|-----------------|
| 1 I | 15 XV | 200 CC |
| 2 II | 16 XVI | 300 CCC |
| 3 III | 17 XVII | 400 CCCC |
| 4 IIII or IV | 18 XVIII | 500 D |
| 5 V | 19 XIX | 600 DC |
| 6 VI | 20 XX | 700 DCC |
| 7 VII | 30 XXX | 800 DCCC |
| 8 VIII | 40 XL | 900 DCCCC or CM |
| 9 IX | 50 L | 1,000 M |
| 10 X | 60 LX | 2,000 MM |
| 11 XI | 70 LXX | 3,000 MMM |
| 12 XII | 80 LXXX | 4,000 MMMM |
| 13 XIII | 90 XC | |
| 14 XIV | 100 C | |

STRAWBOARDS

The following tables show approximately the number of sheets to the cwt. in various sizes used in the trade:

| Inches | 1½ lb. | 1¾ lb. | 2 lb. | 2¼ lb. | 2½ lb. | 2¾ lb. | 3 lb. | 3½ lb. |
|---------|--------|--------|-------|--------|--------|--------|-------|--------|
| 25 × 30 | 75 | 64 | 56 | 49 | 44 | 40 | 47 | 32 |
| 22 × 32 | 79 | 68 | 59 | 52 | 46 | 42 | 39 | 34 |
| 24 × 38 | 61 | 52 | 45 | 40 | 36 | 32 | 30 | 26 |
| 25 × 40 | 56 | 48 | 42 | 36 | 33 | 30 | 27 | 24 |
| 27 × 34 | 61 | 52 | 44 | 39 | 35 | 32 | 30 | 26 |
| 28 × 36 | 55 | 47 | 41 | 36 | 32 | 29 | 27 | 23 |
| 30 × 40 | 46 | 40 | 35 | 30 | 27 | 25 | 23 | 20 |

| Inches | 4 oz. | 6 oz. | 8 oz. | 10 oz. | 12 oz. | 14 oz. | 16 oz. | 18 oz. | 20 oz. | 22 oz. |
|----------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| 22 × 32 | 448 | 299 | 224 | 179 | 149 | 128 | 112 | 99 | 89 | 86 |
| 20 × 30 | 524 | 350 | 262 | 210 | 175 | 150 | 131 | 116 | 105 | 95 |
| 22 × 34 | 422 | 281 | 211 | 168 | 140 | 120 | 105 | 93 | 84 | 76 |
| 22 × 36 | 398 | 265 | 199 | 159 | 132 | 113 | 99 | 88 | 79 | 72 |
| 22½ × 28 | 500 | 334 | 250 | 200 | 167 | 143 | 125 | 110 | 100 | 90 |
| 24 × 32 | 410 | 274 | 205 | 164 | 137 | 117 | 102 | 90 | 82 | 74 |
| 24 × 38 | 345 | 230 | 172 | 138 | 115 | 98 | 86 | 76 | 69 | 66 |
| 25 × 30 | 420 | 280 | 210 | 168 | 140 | 120 | 105 | 93 | 84 | 81 |
| 25 × 36 | 350 | 233 | 175 | 140 | 116 | 100 | 87 | 77 | 70 | 63 |
| 25 × 40 | 315 | 210 | 167 | 126 | 105 | 90 | 78 | 69 | 63 | 60 |
| 26 × 32 | 379 | 252 | 189 | 151 | 126 | 108 | 94 | 83 | 75 | 68 |
| 26 × 38 | 319 | 213 | 159 | 127 | 106 | 91 | 79 | 70 | 63 | 57 |
| 27 × 34 | 343 | 229 | 171 | 137 | 114 | 98 | 85 | 75 | 68 | 66 |
| 28 × 36 | 312 | 208 | 156 | 125 | 104 | 89 | 78 | 69 | 62 | 60 |
| 28 × 39 | 288 | 192 | 144 | 115 | 96 | 82 | 72 | 64 | 57 | 52 |
| 29 × 38 | 286 | 191 | 143 | 114 | 95 | 81 | 71 | 63 | 56 | 51 |
| 30 × 40 | 262 | 175 | 131 | 105 | 87 | 75 | 65 | 58 | 52 | 51 |
| 32 × 39 | 252 | 168 | 126 | 100 | 84 | 72 | 63 | 56 | 50 | 45 |
| 32 × 44 | 224 | 149 | 112 | 89 | 74 | 64 | 56 | 49 | 44 | 40 |

The following is a useful table setting out sizes and counts of lined strawboards.

| Inches | 6 oz. | 8 oz. | 10 oz. | 12 oz. | 14 oz. | 16 oz. | 18 oz. | 20 oz. |
|----------|-------|-------|--------|--------|--------|--------|--------|--------|
| 22 × 32 | 264 | 202 | 165 | 139 | 121 | 106 | 95 | 86 |
| 20 × 30 | 309 | 237 | 193 | 163 | 142 | 124 | 111 | 101 |
| 22 × 34 | 248 | 190 | 155 | 133 | 114 | 100 | 89 | 81 |
| 22 × 36 | 234 | 179 | 146 | 123 | 107 | 94 | 84 | 76 |
| 22½ × 28 | 295 | 225 | 184 | 155 | 135 | 118 | 106 | 96 |
| 24 × 32 | 242 | 185 | 151 | 127 | 110 | 97 | 87 | 78 |
| 24 × 38 | 203 | 156 | 127 | 107 | 93 | 81 | 73 | 66 |
| 25 × 30 | 247 | 189 | 154 | 130 | 113 | 99 | 89 | 80 |
| 25 × 36 | 206 | 158 | 129 | 108 | 94 | 83 | 74 | 67 |
| 25 × 40 | 185 | 142 | 116 | 97 | 85 | 74 | 66 | 60 |
| 26 × 32 | 223 | 171 | 139 | 117 | 102 | 90 | 80 | 73 |
| 26 × 38 | 188 | 144 | 117 | 99 | 86 | 75 | 67 | 61 |
| 27 × 34 | 202 | 155 | 126 | 106 | 93 | 81 | 73 | 66 |
| 28 × 36 | 184 | 141 | 115 | 97 | 84 | 74 | 66 | 60 |
| 28 × 39 | 170 | 130 | 106 | 89 | 78 | 68 | 61 | 55 |
| 29 × 38 | 168 | 129 | 105 | 88 | 77 | 67 | 60 | 55 |
| 30 × 40 | 154 | 118 | 97 | 81 | 71 | 62 | 55 | 50 |
| 32 × 39 | 149 | 114 | 93 | 78 | 68 | 60 | 53 | 48 |
| 32 × 44 | 132 | 101 | 82 | 69 | 60 | 53 | 47 | 43 |

SIZES OF PAPER

| Name of Paper | Broad-side | Broad-folio | Long Thirds | Com. Quarto | Com. Octavo |
|---------------|------------|-------------|-------------|-------------|-------------|
| Double Super | 27½ × 41 | 20½ × 27½ | 9 × 41 | 13¾ × 20½ | 10¼ × 13¾ |
| Royal | 25 × 40 | 20 × 25 | 8½ × 40 | 12½ × 20 | 10 × 12½ |
| Double Demy | 22½ × 35 | 17½ × 22½ | 7½ × 35 | 11¼ × 17½ | 8¾ × 11¼ |
| Double | | | | | |
| Large Post | 21 × 33 | 16½ × 21 | 7 × 33 | 10½ × 16½ | 8½ × 10½ |
| Double Crown | 20 × 30 | 15 × 20 | 6½ × 30 | 10 × 15 | 7½ × 10 |
| Double Post | 19½ × 31½ | 15½ × 19½ | 6½ × 31½ | 9¾ × 15¾ | 8 × 9¾ |
| Double Fcap | 17 × 27 | 13½ × 17 | 5½ × 27 | 8½ × 13½ | 6¾ × 8½ |
| Imperial | 22 × 30 | 15 × 22 | 7½ × 30 | 11 × 15 | 7½ × 11 |
| Super Royal | 20½ × 27½ | 13¾ × 20½ | 7 × 27½ | 10¼ × 13¾ | 7 × 10¼ |
| Royal | 20 × 25 | 12½ × 20 | 6¾ × 25 | 10 × 12½ | 6¾ × 10 |
| Medium | 18 × 23 | 11½ × 18 | 6 × 23 | 9 × 11½ | 5¾ × 9 |
| Demy | 17½ × 22½ | 11¼ × 17½ | 6 × 22½ | 8¾ × 11¼ | 5½ × 8¾ |
| Large Post | 16½ × 21 | 10½ × 16½ | 5½ × 21 | 8½ × 10½ | 5½ × 8½ |
| Crown | 15 × 20 | 10 × 15 | 5 × 20 | 7½ × 10 | 5 × 7½ |
| Small Post | 15¾ × 19½ | 9¾ × 15¾ | 5½ × 19½ | 8 × 9¾ | 5 × 8 |
| Foolscap | 13½ × 17 | 8½ × 13½ | 4½ × 17 | 6¾ × 8½ | 4½ × 6¾ |

PAPER MEASURE

| | | | | | |
|-----|----------------------|-----|-----|-----|------------------|
| 24 | Sheets make | ... | ... | ... | 1 Quire |
| 20 | Quires | ... | ... | ... | 1 Ream |
| 21½ | Quires or 516 sheets | ... | ... | ... | 1 Printer's Ream |
| 2 | Reams | ... | ... | ... | 1 Bundle |
| 60 | Skins of Parchment | ... | ... | ... | 1 Roll |
| 10 | Reams | ... | ... | ... | 1 Bale |

SIZES OF GUMMED PAPERS FOR LABEL WORK, ETC.

18 × 23 in. 20 × 25 in. 20 × 30 in. 23 × 23 in. 500's.
(Everyday qualities.)
18 × 23 in. 500's. (Treble gummed grades—also on reels.)
18 × 23 in. 20 × 25 in. 20 × 30 in. 500's.
(Tinted pulp gummed papers.)
Gummed paper is also supplied on narrow to wide width coils and reels by any diameter for machine use.

EMERGENCY WEIGHTS AND MEASURES

| | |
|--------------------------------|-----------------------------------|
| The diameter of one penny | .. approx. $1\frac{3}{16}$ in. |
| The diameter of one halfpenny | .. approx. 1 in. |
| 5 pennies placed in a row | .. approx. 6 in. |
| 3 pennies weigh | .. approx. 1 oz. |
| 10 sixpences weigh | .. approx. 1 oz. |
| One shilling standing edgewise | .. approx. type high 0.918 in. |

SIZES OF INDEX BOARDS

| Designation | Size | Multiplication factor for converting weight in lb./ream to g.s.m. |
|---------------------------|---|---|
| Index Royal | in. $20\frac{1}{2} \times 25\frac{1}{2}$ | 13.45 |
| Index Royal and a half | $25\frac{1}{2} \times 30\frac{1}{2}$ | 9.04 |

SIZES OF PASTE, DUPLEX, TRIPLEX AND IVORY BOARDS

| Designation | Size | Multiplication factor for converting weight in lb./ream to g.s.m. |
|----------------|--------------------------------------|---|
| Paste Royal | in. $20\frac{1}{2} \times 25$ | 13.72 |
| Postal | $22\frac{1}{2} \times 28\frac{1}{2}$ | 10.96 |
| Paste Imperial | $22\frac{1}{2} \times 30$ | 10.42 |

SIZES OF PULP BOARDS

| Designation | Size | Multiplication factor for converting weight in lb./ream to g.s.m. |
|-------------|--------------------------------------|---|
| Pulp Royal | in. $20\frac{1}{2} \times 25$ | 13.72 |
| Postal | $22\frac{1}{2} \times 28\frac{1}{2}$ | 10.96 |
| Imperial | 22×30 | 10.65 |

PACKAGING AND LABELLING

The measure of quantity for the boards covered in the Tables above shall be 100 boards. Packages shall contain 100 or 50 boards according to the size and weight of the board. Labels shall show:

- Description of contents.
- Quantity (i.e. number of boards).
- Weight in pounds per 100 sheets and in grammes per square metre.
- Size in inches.

MACHINE DIRECTION

The machine direction of boards shall be indicated on the wrapper of each packet.

SIZES OF BRISTOL BOARDS

| | Inches |
|-------------|---------------------------|
| Foolscap | $15\frac{1}{4} \times 12$ |
| Demy | $18\frac{1}{2} \times 14$ |
| Medium | 21×16 |
| Royal | $22\frac{1}{2} \times 18$ |
| Super Royal | $25\frac{1}{4} \times 18$ |
| Imperial | $28\frac{1}{2} \times 21$ |

SUBDIVISIONS OF A REAM (500 sheets)

| | | |
|------------------|---------|--------------|
| Cut Folio gives | .. .. . | 1,000 sheets |
| Cut Quarto gives | .. .. . | 2,000 sheets |
| Cut 6mo gives | .. .. . | 3,000 sheets |
| Cut 8vo gives | .. .. . | 4,000 sheets |
| Cut 16mo gives | .. .. . | 8,000 sheets |

DESIGNATION OF SHEET FOLDS

When a sheet is folded or cut into:

| | | |
|-----------------------------|---------|--------------|
| 2 leaves the size is called | .. .. . | Folio |
| 4 " " " " " | .. .. . | Quarto (4to) |
| 6 " " " " " | .. .. . | (6mo) |
| 8 " " " " " | .. .. . | Octavo (8vo) |
| 9 " " " " " | .. .. . | 9mo |
| 12 " " " " " | .. .. . | 12mo |
| 16 " " " " " | .. .. . | 16mo |
| 18 " " " " " | .. .. . | 18mo |
| 20 " " " " " | .. .. . | 20mo |
| 32 " " " " " | .. .. . | 32mo |
| 36 " " " " " | .. .. . | 36mo |

BROWNS AND WRAPPINGS

| | | | |
|----------------|------------------------------------|-------------------|---|
| Cap (Bag) | .. 24 \times $19\frac{1}{2}$ in. | Elephant (Double) | 46 \times 31 in. |
| Cap (Dble Bag) | .. 39 \times 24 in. | Imperial | .. 29 \times $22\frac{1}{2}$ in. |
| Cap (Havon) | .. 26 \times 21 in. | Lumber-hand | .. $22\frac{1}{2} \times 17\frac{1}{2}$ in. |
| Cap (Kent) | .. 21 \times 18 in. | Small Cap | .. 25 \times 17 in. |
| Casing | .. 46 \times 36 in. | Small-hand | .. 20 \times 15 in. |
| Crown (Double) | .. 30 \times 20 in. | Small-hand (Dble) | 29 \times 20 in. |
| Elephant | .. 32 \times 24 in. | Small Hand | |
| | | (Dble Dble) | .. 40 \times 30 in. |

EQUIVALENTS OF IMPERIAL AND METRIC WEIGHTS AND MEASURES

IMPERIAL TO METRIC
LINEAR MEASURE

| | |
|-----------|-----------------------|
| 1 inch | .. 25.400 millimetres |
| 1 foot | .. 0.30480 metre |
| 1 yard | .. 0.914399 metre |
| 1 fathom | .. 1.8288 metres |
| 1 pole | .. 5.0292 metres |
| 1 chain | .. 20.1168 metres |
| 1 furlong | .. 201.168 metres |
| 1 mile | .. 1.6093 kilometres |

SQUARE MEASURE

| | |
|---------------|---------------------------|
| 1 square inch | .. 6.4516 sq. centimetres |
| 1 square foot | .. 9.2903 sq. decimetres |
| 1 square yard | .. 0.836126 sq. metre |
| 1 sq. perch | .. 25.293 sq. metres |
| 1 rood | .. 10.117 ares |
| 1 acre | .. 0.40468 hectare |
| 1 sq. mile | .. 259.00 hectares |

CUBIC MEASURE

| | |
|--------------|-----------------------------|
| 1 cubic inch | .. 16.387 cubic centimetres |
| 1 cubic foot | .. 0.028317 cubic metre |
| 1 cubic yard | .. 0.764553 cubic metre |

MEASURE OF CAPACITY

| | |
|-----------|----------------------|
| 1 pint | .. 0.568 litre |
| 1 quart | .. 1.136 litres |
| 1 gallon | .. 4.5459631 litres |
| 1 peck | .. 9.092 litres |
| 1 bushel | .. 3.637 decalitres |
| 1 quarter | .. 2.909 hectolitres |

APOTHECARIES MEASURE

| | |
|-----------------|------------------------|
| 1 minim | .. 0.059 millilitre |
| 1 fluid scruple | .. 1.184 millilitres |
| 1 fluid drachm | .. 3.552 millilitres |
| 1 fluid ounce | .. 28.4123 centilitres |
| 1 pint | .. 0.568 litre |
| 1 gallon | .. 4.5459631 litres |

APOTHECARIES WEIGHT

| | |
|-----------|--------------------|
| 1 grain | .. 0.0648 gramme |
| 1 scruple | .. 1.296 grammes |
| 1 drachm | .. 3.888 grammes |
| 1 ounce | .. 31.1035 grammes |

AVOIRDUPOIS WEIGHT

| | |
|------------------|---|
| 1 grain | .. 0.0648 gramme |
| 1 drachm | .. 1.772 grammes |
| 1 ounce | .. 28.350 grammes |
| 1 pound | .. 0.45359243 kilogram |
| 1 stone | .. 6.350 kilograms |
| 1 quarter | .. 12.70 kilograms |
| 1 hundred-weight | .. 50.80 kilograms .. 0.5080 quintal |
| 1 ton | .. 1016.047 kilograms .. 1.0160 tonnes |

TROY WEIGHT

| | |
|---------------|--------------------|
| 1 grain | .. 0.0648 gramme |
| 1 pennyweight | .. 1.5552 grammes |
| 1 troy ounce | .. 31.1035 grammes |

EQUIVALENTS OF IMPERIAL AND METRIC WEIGHTS AND MEASURES
(Continued)

| METRIC TO IMPERIAL | | MEASURE OF CAPACITY | |
|--------------------|-------------------------|---------------------|-------------------------|
| LINEAR MEASURE | | | |
| millimetre | .. 0.03937 inch | 1 centilitre | .. 0.070 gill |
| centimetre | .. 0.3937 inch | 1 decilitre | .. 0.176 pint |
| decimetre | .. 3.937 inches | 1 litre | .. 1.75980 pints |
| metre | .. 39.370113 inches | 1 decalitre | .. 2.200 gallons |
| | .. 3.280843 feet | 1 hectolitre | .. 2.75 bushels |
| decametre | .. 10.936 yards | AVOIRDUPOIS WEIGHT | |
| hectometre | .. 109.36 yards | 1 milligram | .. 0.015 grain |
| kilometre | .. 0.62137 mile | 1 centigram | .. 0.154 grain |
| | | 1 decigram | .. 1.543 grains |
| | | 1 gramme | .. 15.432 grains |
| | | 1 decagram | .. 5.644 drams |
| | | 1 hectogram | .. 3.527 ounces |
| | | 1 kilogram | .. 2.2046223 pounds |
| | | 1 myriagram | .. 22.046 pounds |
| | | 1 quintal | .. 1.968 cwt. |
| | | 1 tonne | .. 0.9842 ton |
| SQUARE MEASURE | | TROY WEIGHT | |
| 1 sq. centimetre | .. 0.15500 sq. inch | 1 gramme | .. 0.03215 ounce (troy) |
| 1 sq. decimetre | .. 15.500 sq. inches | | .. 15.432 grains |
| 1 sq. metre | .. 10.764 sq. feet | APOTHECARIES WEIGHT | |
| | .. 1.196 sq. yards | 1 gramme | .. 0.2572 drachm |
| 1 are | .. 119.60 sq. yards | | .. 0.7716 scruple |
| 1 hectare | .. 2.4711 acres | | .. 15.432 grains |
| CUBIC MEASURE | | | |
| 1 cubic centimetre | .. 0.0610 cubic inch | | |
| 1 cubic decimetre | .. 61.024 cubic inches | | |
| 1 cubic metre | .. 35.3148 cubic feet | | |
| | .. 1.307954 cubic yards | | |

Paper and Board Qualities

The term paper may be described as an omnibus word popularly used to describe all kinds of paper and often board, but for the purpose of the packer, the packager, the printer and the print buyer, sub-titles or quality groups may be outlined as follows:

(a) *Printings*.—Any paper which is capable of printing by any of the popular processes, i.e. letterpress, litho in all its forms, photogravure, silk screen, die stamping and duplicating. The surface of the paper has a relationship to the process of printing and it may be machine finished (m.f.) or super calendered (s.c.) as the case may be. Sizing of the paper and additives also have an influence upon printed results. Printings are made in all the sizes tabulated out in the list of printings and writings.

(b) *Writings*.—These have little or no application in packaging but may be used for printed matter of the sales promotion type such as brochures, high class price lists but in the main, for business stationery.

(c) *Boards*.—The packaging industry uses all kinds of boards for the manufacture of cartons, packing cases, containers, cartons and boxes of every conceivable size and shape. Quality and colours, basic material and substances all have a bearing upon the usage and application of board material; price is also a factor on quality choice.

(d) *Wrappings*.—There are what may be termed industrial wrappings such as Browns and laminated krafts and fancy printed decorative packaging types of wrapping paper. In this field are the box making paper, embossed and grained papers, signature papers and other specialized wrappings. Filmic materials and foil laminates may be included in this group. There are many other packaging specialities that have been developed as a result of user and maker contact and one may well stress at this point, the paramount importance of an exchange of special requirements, ideas, knowledge so that the best paper for the job may be supplied or formulated for the purpose.

The name of each paper group is invariably descriptive of the application of the paper, i.e. printings, which include newsprint, M.F. printings, imitation arts, antiques, woves and laids, M.G. posters, cartridge papers, coated papers, chromos and enamels, all being used by the printer in the various processes of printing.

At the same time, writings are used by the printer for business stationery and by the stationer for converted stationery in the form of notepaper and envelopes, etc. Writings, ledger papers, etc., cream woves and laids are used for account book work, exercise books, jotters, etc.

In the field of boards, there are paste boards, triplex boards, pulp boards, laminated boards of all grades in standard sizes and calipers or sheetage. There is also a series of coated folding box boards used in the field of packaging for high-class carton work.

There has been more development in the field of wrappings than in any other type of paper. This is due in no small measure to the demands of the packing and packaging industries who annually use large quantities of specialized wrappings as protective barriers for products and for bale packing all kinds of merchandise for home and overseas trade. It is true to say that in many cases, heavy wrappings such as bitumen loaded kraft papers, and reinforced sisal krafts are serving a useful purpose in the place of wooden packing cases.

Under the heading of speciality papers may be included various types of coated, impregnated, laminated, thermoplastic and non-curling gummed papers, printed surface and fancy papers, many of these have been formulated in recent years having an application in other industries as a raw material in manufacturing processes. The development in this field of paper has been considerable, many grades have been produced as the result of extensive research in the paper mill and paper converters' laboratories.

Miscellaneous papers include a series of papers such as cloth lined and cloth centre papers and boards, tympan papers for the printer, cheque papers for receipt work, blottings, all of which are used in commerce and industry for special purposes. Here is a brief review of the various grades outlined above.

Printings.—China clay among other non-fibrous constituents used in the manufacture of paper features very largely in printing papers, improving the surface, handle and finish of the sheet. Without the addition of a paper filler, loading or clay, paper itself would be a poor printing medium. The more clay, therefore, that can be usefully incorporated into paper the better the printing ink reception. The addition of clay, however, must be limited in volume as it reduces the strength of paper and excessive percentages would seriously reduce paper strength and durability.

Formerly china clay was used as a filler on account of economy and price reduction being possible in days of competition. It has also been used where there has been shortages of raw material as its use can result in a saving of fibrous materials which are more costly. The use of china clay can achieve a reduction in the expansion of paper and give greater opacity and higher surface finish or gloss. In papers used by the printer such as imitation art, up to 35 per

cent of clay may be used as an additive. There is a very wide range of clays used in paper making, some grades having an application in the process of paper coating, particularly art papers, enamels, surfaces and chromos, which may contain as much as 50 per cent of high quality china clay as a surface coating medium. Progress continues to be made in connection with the use and application of clays for both as a paper making filler and paper coating medium.

Printings vary considerably in overall content, their fibre furnish, sizing medium and surface finish. The price of printing varies very considerably with the quality and type. The printer chooses his paper with discretion based upon the printing process and surface requirement. Some general standards are good surface or finish, clean colour, texture and handle, look-through, opacity and durability. Some or all of these qualities may be present in printings; these and other features may be specified to the paper-maker in the case of making orders. Printings cover a very wide range of papers from cheap grades of white and tinted pulp papers to high coated varieties. Newsprint is used for cheap leaflets and price lists in addition to newspapers, magazines, etc., and the printer uses large quantities of inexpensive M.F. and S.C. printings for similar work.

Good results are obtained by the printer, coarse screen blocks, letterpress and line illustrations being produced on such paper surfaces. For high-class half-tone colour printing and lithographic processes, high grade coated papers, boards and litho printings are used. The manufacture of printings is much the same in principle throughout the many varieties of papers included in this group, the fundamental difference being the furnish, the beating, the additive, and, in the case of coated papers, the coating recipe used. Sizing plays an important part in many printings, some printings are soft sized, some medium and others are hard sized. Soft sized papers can result in ink penetration of the paper (unsized papers are blottings) and in the case of medium to hard sized papers, these will resist ink penetration, the latter being specially suitable for varnishing after printing; sizing is added to the pulp in the beating engine. Other soft sized papers are duplicators.

In general, the furnish of high grade printings varies from a mixture of rag and chemical wood or chemical wood and esparto grass. Some papers contain a full content of esparto or chemical wood with a similar percentage of suitable fibre blended into the mixture. The quality of the paper is influenced by the beating process. Where an opaque printing paper is required, paper makers often blend soda pulp with sulphite which corrects any tendency to transparency which is the general characteristic of paper made from sulphite. Esparto grass produces a soft sheet with flexibility and mellowness. They are soft to the tear and their smooth surface makes them ideally suitable for either printing or writing purposes. Esparto grass papers, therefore, are very suitable for manufactured stationery. Esparto papers possess very little strength and where this is required wood pulp provides the additional rigidity and handling qualities to the finished paper.

Antiques are a bulky rough surface variety of paper used

in the publishing trade for book work where bulk is often required. While the surface or finish is rough, good type face reproduction and line block illustrations are possible. Coated paper insets are often used for coloured half-tone illustration work where antique papers are used for the text. Feather-weight and antique papers are made in either wove or laid watermarked impression; some have deckle edges, a process produced by certain adjustments to the deckle strap of the paper making machine while the pulp is flowing over the machine wire. There are various grades of antiques and they are made in standard bulk; they are not very durable and are, therefore, not recommended for printed work which is subjected to constant reference or frequent handling.

Imitation art papers and water-finished printings are first-class examples of papers carrying a mineral loading to provide a good finish to the paper. In the process of manufacture a coated-like finish is imparted to the paper surface by spraying a fine film of water against the web during its passage through the calender rolls of the paper making machine. Most papers in this field have an esparto content; they are soft and reasonably free from stretch and their surface is such that fine colour process work from half-tone blocks may be faithfully reproduced. Some grades are produced from wood pulp but they are not durable papers and are often not capable of producing first class printing results. At the same time, cheap grades of imitation art do not receive the additional water finish which brings a gloss on to the surface of the paper, the finish in cheaper grades being obtained by the calenders. Imitation art papers are made in white and a range of colours in all the usual printing sizes and weights. They are quite distinct from genuine brush coated papers, where the high surface is obtained by the application of a coating mixture on to a base paper, the price between the two grades of paper obviously varies.

Among the series of printings in popular use are M.G. posters. These papers are highly glazed on one side to provide the necessary printing surface for colour work. Such papers are made on the M.G. machine or Yankee with the single drying cylinder. Qualities vary from mechanical wood content to pure chemical wood grades, both grades being used for letterpress or particularly lithographic printing in connection with outdoor publicity and poster work. The rough surface on the underside assists in the speed and easy fly-posting process.

There are a wide variety of off-set and smooth finished cartridge papers used for off-set litho made in white and pale tints in the usual printing sizes and weights. They vary in quality, the surface being smooth in relation to printer requirements. Most cartridge papers are very durable and are used for sales promotion folders, pamphlets and cover work, broadsheets and broadsides, where folding and handling qualities are essential factors. High class cartridge papers are also used in the drawing office.

Banks and Bonds come under the heading of Printings and/or Writings and are used for letterheads, business forms and general office stationery where quality, good handling and colour is desirable. Bond papers are also used for letter-

press, off-set, die stamping and machine ruling. Most grades are known for their flatness and their ease of running qualities on fast automatic printing machines. Many grades are water-marked and branded, the best grades are guillotine trimmed on all sides of the sheet and mill conditioned. Banks and bonds are made in white or cream wove and in a wide variety of colours.

Varnishable litho papers and chromos are special grades of printings designed for high class colour printing, particularly label work where the printed job is afterwards often treated to a surface coating of spirit varnish or nitro-cellulose. These papers are hard sized and are stocked in the usual printing sizes and weights.

Coated Papers and Boards.—Base papers and boards are coated one or two sides in white and colours producing an endless variety of art papers, chromos, enamels, surface papers and boards all termed Coated Papers. These papers are suitable for various processes of printing; they are even and smooth or satin-like in surface in varying degrees of finish making them specially suitable for letterpress processes. Used for label work, box tops, high class folders and brochure, packaging papers, book and magazine work, they are made in a series of sizes, and weights, the base paper varying in substance. Surface and enamel papers are used by the box maker for lining purposes and in many cases coated papers are supplied on the reel to specification or coating mill standard widths.

In the process of coating base papers, the paper undergoes a brushing with the various coating mixtures the recipe of which varies very considerably in quality and content, an adhesive being used to bind the colour pigment or clay on to the surface of the paper. Coating mills are situated in Scotland, most body papers being used carrying an esparto grass furnish. Inexpensive grades are made from part esparto and mechanical wood, etc. The paper converter or coater invariably receives the basic papers from the paper maker made to specification of paper sizing and surface and other qualities which assist in the process of coating recipes on to base paper.

A popular coating mixture is one prepared from blanc fixe, china clay, the binding agent being casein. With such a wide variety of grades, cheaper mineral content is often used. The mixture of white pigment, adhesive and water is run into the trough of the coating machine where the process of coating takes place. Coating may be applied either one side or two sides of the base paper in one operation by means of roller or brush application, some of which are stationery and some oscillating. The function of the brush is to rub the surface thoroughly with a coating mixture. The coating fills up any unevenness in the body paper leaving an even and smooth film of coating on the surface of the paper. Next comes the drying and this is done by the festoon process where the paper is carried forward by an endless chain of rods, hot air being applied to the paper in its travel to the re-winder. Papers are coated one and two sides, and the finishes vary from matt, dull to bright finish. One-sided papers usually fall under the heading of chromo papers, being coated on one side only, the body paper varying in substance to quite heavy weights. Papers are also twice

coated, in particular, one-sided grades, and these are termed proofing chromos used for very high-class printing for letterpress and lithographic processes, both dull and high gloss finishes being made.

There are a wide range of colours made in art paper, usually delicate tints used for high-class leaflet and booklet work. Duplex papers—coated on each side in different shades or colours—are popularly used for advertising and publicity novelty folders. Some of the colours are quite strong and arresting when made up into folders which reveal the two colours.

A very popular series of printings, both mechanical and pure, are termed glazed tints. These are everyday papers used for leaflet and booklet work, made in the usual printing sizes and weights and varying in qualities.

Boards.—This word is a generic term describing thick, heavyweight or stiff paper and varies from card substance of 0.2 mm. or 1/25 of an inch in thickness, caliper or substance to 5 mm. or 1/5 of an inch and thicker, varying in furnish from straw and other raw material to wood and rag. Many types of board are manufactured on the same principle as paper. Made in a very wide variety of qualities, finishes, colours, calipers, sheetage or thickness but few standard sizes, among which Postal and Royal are the most popular. Various types of boards are cut into standard small sizes and termed Printers Blanks. A very large tonnage of boards is produced and used annually for a wide variety of purposes including use as covers, folders, index cards, reference cards, visiting cards, admission cards, boards for lining and mounting, showcard work, display outers, packaging cartons, etc., etc.

Strawboards made from straw pulp are found at one end of the scale while such grades as Ivory, Whatman and high grade coated chromo boards may be considered as the peak of board perfection for various processes of printing, conversion and usage. Quantities of carton board and folding box boards are used annually by packers and packagers in connection with cartons and containers for packaging all kinds of merchandise and products. Many of these carry first class surfaces for printing and scoring and are made up into cartons from the continuous web or board material by modern fast running automatic carton and box making machinery.

Pasteboards.—These are made in various sheet substances, but only where the caliper of the board is also stated can the sheetage be an accurate guide to the actual substance, as makers' thicknesses vary a good deal. Made in white and colours in the standard boards sizes of 20 in. by 25 in. (Royal), 22½ in. by 28½ in. (Postal), 22 in. by 30 in. (Imperial), and any other suitable sizes cutting from 20 in., 22½ in. and 25 in. reels, they have many everyday uses for showcards, price tickets, calender work and indeed for a whole range of printed matter. The boards are actually pasted, the lining being pasted to the body material.

Triplex Boards.—In the same family as the pasteboard, they are not, however, made in the same range of substances as the pasteboard. The body material is lined both sides with the surface material white or in colours as desired.

Pulp Boards.—These are a very popular grade of board used for many purposes, and stand a good deal of use and handling and are not liable to split like some pasted boards. Made in white and colours with a good even surface, they are ideal for record and similar cards which are printed and ruled. They have a good surface for ink. Esparto fibre is one of the popular raw materials used in pulp boards.

Coated Folding Box Boards.—Light substance boards may be coated on the coating machine, the chief characteristic of these boards being good folding and printing qualities. They are used extensively for carton and containers for small products. Supplied in size 30 in by 40 in., they are made in white and colours, suitable sizes being cut from varying widths of mill reels. Many other varieties of coated boards are made, and among these are art boards—made one and two-sided, tinted art boards, coated postcard boards for colour work, coloured surface boards for general ticket work, coated (one side) manilla boards for strong tag manufacture, chromo and enamel boards, to mention some of these qualities. Most of these are made on esparto body material, and coated in white and colours with a fine even surface for the purpose of printing. Coated boards may also be made by lining or pasting enamel or surface papers to a body material.

Strawboards.—Other types of boards include strawboards which are listed for sizes and thickness in the appropriate tables in this book. At one time considered the main raw material for box making, strawboards have been augmented to a large extent by fibreboard, corrugated board and similar material used for packing case and container making. Current strawboards have unlined or lined surfaces, good bending and bulking qualities and are recognized by the light brown colour typical of the straw material from which they are made.

Wood Pulp Boards.—A board with great strength and tenacity used for boxmaking as an alternative to strawboard, the first class folding qualities and good surfaces making them highly suitable for machine produced boards.

Leather Boards.—Glazed leather boards are made by machine by various methods, in single sheets or layers, often covered with a liner. They are tough, strong boards with either a glazed or unglazed surface, often with an imitation leather board finish, a final glazing being carried out by hand or machine. The raw materials used vary, but the best grades incorporate percentages of shredded leather scraps in combination with wood pulp. Leather board surface covered with linings of good quality are used for mounting purposes, loose soles and for insertion in boots and for the covers of cash and account books.

Presspahn.—A continental name for insulated boards. They are stiff, hard rolled, possessing a smooth surface glazed on one or both sides. These very durable boards are made from rag or wood sulphite pulps and are used for printers interleaves, the manufacture of tubes and coils in the electrical industries, insulating; they also have an application in the textile industries. They are also laminated into very thick substances where they may be punched or cut to shape by guillotine, press or blanking out machine.

Fibreboard.—A product of the board mills, may be finished

with a waterproof surface smooth or corrugated in style. Made from waste material the final product possesses outstanding strength, waterproof qualities and good printing surface. Used in the manufacture of packing cases, containers and cartons for packaging all kinds of merchandise.

Carton Board.—An inexpensive pale brown board used in connection with the manufacture of cartons, boxes and display outers. Carton board making machines handle the material in the web, punching, creasing, printing and producing finished cartons of all sizes and shapes at high speeds.

Wrappings.—In the field of wrappings and packaging papers, enormous progress has been made in the development and production of both waterproof wrappings for merchandise packing, and fancy wrapping papers termed signature papers, special occasion and gift fancy wrappings. In the kraft groups there are waterproof, acid and alkaline resisting grades, fireproof, moisture-proof, water-vapour-proof, corrosion proof types of wrappings which include bitumen loaded and reinforcements with sisal and/or glass fibres. Sensitive, fragile and valuable merchandise may be wrapped in a specially selected kraft wrapping and be despatched or stored under all conditions of climate and humidity. Many of these krafts are used as linings for wooden packing cases, and bags, some are being used as a substitute for wooden cases, while other types of strong krafts are used for multi-wall sacks and bags. Browns of all grades are comparatively inexpensive and include various types of wrapping material in common use in everyday commerce and industry for packing limited quantities of light and bulky goods. Browns and wrappings are made in M.G. or glazed varieties, strong krafts are made from pure sulphate wood. Heretofore the strongest krafts were made in Scandinavia and Canada, but due to raw material supply problems and other emergencies, considerable experience has been gained in this country and first class krafts are now being made at home. Most kraft papers are purchased and specified for bursting, tearing and tensile strength. There are also a series of thin M.G. and unglazed wrappings, plain and ribbed supplied in roll form for use in retail shops for wrapping and for use in connection with counter roll holders.

Perhaps the most interesting development in wrapping papers is in connection with gift and special occasion wrappings. Hitherto, Christmas and Easter were the only periods of the year marked by a specially produced fancy designed wrapping. Current series take the form of printed paper with a traditional motif in colour relative to the season or occasion. Today packagers are using greetings papers in connection with other important dates in the calendar such as birthdays, weddings, christenings, etc., etc. Gift items with a 'special occasion' appeal are wrapped and may be purchased complete with an appropriate fancy wrapping, greetings label and tag so that they may be addressed and sent through the post.

Signature Papers.—A recent introduction, these wrapping papers are a specialized type of printed and embossed paper, the design incorporating the manufacturer's name, trade mark, message or other emblems, all of which are often worked up into an attractive design printed in colour and

embossed on many kinds of base papers. The basic paper may be any type of printing, white or coloured, aluminium foil, coated papers, etc. Signature papers are printed in the reel and may be used in this way in connection with automatic machine packaging schemes; they are also supplied in the flat sheet 20 in. \times 30 in. being a popular size.

Brown and other colours are made so that a user may link up the wrapping process with the colour scheme associated with the product. Coloured krafts are also used in connection with the manufacture of gummed tapes, the glue being coated on to either the M.G. or unglazed side of the kraft.

There are various imitation kraft wrapping papers where mechanical wood is used in the pulp in suitable proportions in relation to the strength of the finished paper. Browns, another type of wrapping in a cheaper grade, are made from various kinds of raw materials particularly those which do not require special treatment such as waste, hemp waste, sacking and similar materials. Such papers have little strength and are used as an interior shock absorber when packing certain kinds of stationery, books and other similar material, which are also wrapped with an outer wrapper of kraft. Heavier grades of brown are also made from all kinds of waste material and in this category comes grocery papers, caps, mill wrappers, and the material for corrugated papers, etc. At the other end of the scale there are a series of brown tissues or nature wrappings made from mechanical wood pulp. Every trade uses a special wrapping, and many of these grades are named according to the product or groups of articles wrapped.

Some of these are chemist's blue, abrasive papers, ammunition paper used for the manufacture of sporting cartridges, butter papers (a series of greaseproof papers for wrapping fats, etc.), carbolic papers which have been impregnated with carbolic acid, cutlery papers, M.G. caps for drapers, fruit wrappings, hosiery wrappings, railway buff wrappings which are also used for a variety of purposes, including rail forms, etc., needle papers, to mention some among the wide series in this field. Most of these wrappings have special qualities and characteristics—some, for instance, are made to prevent discoloration of the goods so packed.

Bag papers come in this category, and are either glazed, M.G. or unglazed sulphite papers.

Waxed tissues and parchments, vegetable parchments, glazed transparents are all grouped in the wrappings category, their use being popular in the food and allied trades for wrapping products to be protected against the atmosphere and moisture generally.

Fancy Papers.—This term includes box-making papers, lining papers and display papers. They are made in an endless variety of qualities, patterns and embossings. The bulk of the fancy paper trade concerns the box-maker who produces very high class caskets, boxes, cartons, wallets and compendiums of every shape, size and style with fancy paper lined on to board material of various kinds. While there is a tendency to produce carton printed board for mass produced box making, there is still a wide field for fancy paper usage. Fancy papers include such grades as metal and aluminium embossed papers, tartan papers, floral

fancy papers, wood grain and wood veneer papers, flock papers, leatherettes, marble papers (both hand made and machine produced).

Leather Papers.—These papers are used for box coverings, the covers of exercise books, etc. The body paper is strong and flexible, and is coated one side and later embossed with metal rollers with one of the many designs associated with leather graining, such as seal, sand-grain, lizard, and so on. They are supplied in sheets 20 in. by 30 in. and also on reels usually 20 in. wide. They are made in several grades, heavier substance body papers being used for the better class leathers. The best grades are varnished which help to make them more durable and of better appearance.

Marble Papers.—These fall into two main series. First there are the cheap Spanish marble papers, usually supplied in 18 in. by 23 in. and 17 in. by 27 in., which are made on the continent. They are used for end papers and inexpensive box coverings. The designs are often complicated and are well-known as book ends for ledgers, etc. Brown, blue, green and red are popular colour basis for the design.

Another group are the expensive hand-made and coloured marble papers which are made to represent well-known marble characteristics, such as Tuscan, Carrara, and so on. These are used for diaries and good-class box coverings. They are usually supplied in 20 in. by 30 in. and on reels. *Metal Papers.*—These series of papers are used for box-making, wrappings in the thinner qualities, label work, and for many other purposes. In recent years, there has been a popular demand for printing on metal papers, and the finished results often looking very appealing. Many new and unusual effects may be obtained by the printer.

There are the cheap tinfoils, aluminium foils and bronze papers, all or either of which may be used for any of these purposes. Some of these grades are also supplied embossed with an attractive floral, cube, diamond, herring-bone or other designs, and in this case, they make up good class boxes. All these are made from the powder which is coated on to the body paper which has been treated with a suitable adhesive as a binding agent. A more expensive variation is the leaf series, and in this group are aluminium and gold leaf papers.

Next comes a series of metal-lined papers and boards made in mat(t) bright, brushed, lacquered finishes with non-finger marking surfaces. Some of these are corrosion proof, while others are made extra brilliant in silver, gold and a number of choice colours. These are supplied in 20 in. by 30 in. and on 20 in. reels. The uses to which these grades are put are almost endless, and vary from box-making to booklet covers.

Fancy Printed Papers.—The box-maker is well catered for by the seasonal introduction of a large variety of colourful patterns of fancy papers which are designed and printed to suit every possible taste, style and size of box. Many ranges of fancy papers bear well-known trade names, other patterns alter from year to year, only those which gain a place for themselves being retained in the ranges. Body papers in colour, usually greens, blues, reds, orange, yellow, etc., form the basic or body paper on to which a design is printed, often the paper being embossed later. Therefore, the same design

may be had in a number of coloured body papers. The popular size for fancy papers is 20 in. by 30 in. and on 20 in., 26 in. and 30 in. reels. The patterns include attractive seasonal designs for Christmas, Easter and other festivities, and there are subdued, to many varieties of jazz patterns available. In these series may be included cheap fancy prints, pearl embossed coated fancy papers, the more serious and refined Tartan lithographed fancy papers, and many other kinds of box coverings.

Wood Grain and Wood Veneer Papers.—Imitation wood veneer papers are made in England, and include a very attractive range of patterns representing the grain of well-known woods. They are used for a variety of purposes, and usually supplied in 20 in. by 30 in. and on reel 22 in. wide. The more expensive variety of real wood veneer papers are made in Japan from real wood, which is compressed on to a strong body paper. They paste well, and are used for many purposes including showcard and label work.

Coated Fancy Papers.—In this series are Rainbow and other fancy and bizarre box-making papers. Another series in this group are the many ranges of coloured coated body papers with bright and mat(t) finish which are heavily embossed with unusual patterns. They make up into a dignified box suitable for many purposes. The real mother-of-pearl papers are perhaps among the most exclusive and expensive variety of fancy papers made. Usually of continental manufacture, they are used for covering presentation boxes and for similar purposes.

Today there is a tendency to use what are termed Signature Papers. These are a series of papers which carry the packager's or manufacturer's name, brand mark and trading message, worked up into an interesting pattern often produced in colour and embossed, the work being carried out in the reel on many types of base paper; such a paper with individual designs is the property of the packager. Another development is the Special Occasion fancy paper which is an extension of the Christmas and Easter varieties of wrappings. These specially designed wrappings have a particular use to the packager handling a product with a gift appeal. The consumer is able to purchase an article appropriately and attractively wrapped complete with a tie-on tag or greetings label ready for presentation or posting to a friend.

Speciality Papers.—A wide series of what are termed speciality papers have made their appearance in post-war years, some being the product of the paper-maker, others are made by the paper converter and coating specialists. Such papers include viscose and cellulose films, polythene and polyethylene treated papers, basic papers treated with paraffin and microcrystalline waxes, asphalt, cellulose-nitrate, cyclised rubber (Pliolite), polyvinyl chloride and copolymer, polyvinylidene chloride (Saran), cellulose acetate, rubber hydrochloride (Pliofilm), all of which are used in connection with the visible and hygienic packaging of food and allied products, their qualities being their resistance to water-vapour penetration and the fact that they are odourless and tasteless. There is also a wide selection of waxed tissues, papers and parchments which are also waterproof

and hygienic, some coated, some impregnated, serving as water-vapour-proof barriers for wrapped products. Micro-crystalline waxes are coated on to many types of paper and thin board for the purpose of container and carton making. Lampshade parchments, some impregnated with linseed oil, others carrying a glycerine recipe in order to make them flexible, synthetic resin coated papers, nitro-cellulose treated papers, thermoplastic papers, filmic wrappings with inherent heat sealing qualities, and many others, all used in the process of packing and packaging, are made in considerable quantity for an ever growing market centred round the better presentation of products. There are some special types of coated and decorative papers used in the box-making field for display work, shelf papers, table cloths and napkins, paper drapes, wallpapers all coming within this specialized series of papers produced by the paper converting industry. Many functional and protective papers such as polythene coatings and Saran are in the process of advanced experimentation, some are already perfected and many qualities have been produced and are already used as protective barriers for wrapping delicate, fragile, moisture-sensitive foodstuffs and other merchandise in need of full protection from dirt, dust and moisture attack.

A series of high class papers such as friction glazed, imitation gelatines, enamel papers, cast-coated, have an application in the packaging, printing and allied trades. Such papers are recognized by their high finish, waterproof surfaces, fingerproof and handling qualities. Metallic coated papers, luminescent coated and printed papers, mica-coated and embossed, suede, velour and flock papers, transfer papers, chart, map and plan papers, magnetic recording papers, mould, bacteria, insect and pest resisting papers, fireproof and fire retarding papers, plasticizer wrappings, blue print and photographic papers, asphalt, bitumen, sisal, glass fibre, non-curling gummed papers, synthetic resin coated papers, metal foil laminates all come within the series of papers which may be named specialities.

All these papers have a special function and purpose. In the main, they have been formulated for the packaging industry. Many are used as raw material in the electrical, engineering, stationery conversion and allied trades. Their qualifications and full details are far too wide to survey in this chapter which merely outlines such grades and their applications.

There are a very wide range of papers used for many purposes which may be termed unclassified, as they do not fall into any special group. Among these specialities are blotting, the better grades being made from rag (muslins) of fine grade, specially treated during the process of beating. The less expensive grades are made from esparto, with a filler of mineral clay to render the finished sheet absorbent. A popular size and weight is 17½ in. by 22½ in. 38 lb., 480's, and in addition to white many colours are also available. High quality rag blottings are also made with good absorbent qualities which have a highly finished plate glaze smooth enough to reproduce fine line blocks and 100 screen deep-etched half-tones for advertising blotter-work. These are made in white and colours. Other grades are made

especially for offset printing with good absorbent surfaces, and for printing in water-colour ink for advertising envelope stuffers.

Non-Curling Gummed Papers.—In recent years, there has been much progress in the manufacture of gummed papers, and the curly papers made some years ago have long since been forgotten. The introduction of the non-curling process some 40 years ago has now produced a paper which will print and store without any difficulty. Certain conditions must be observed in relation to storage, but these are only normal requirements for most grades of paper that find their way into the press room. The gumming recipes vary from single dextrine to double treble pure gum arabic coatings. These latter are used for special label work for adhesion to woollen and cloth materials as seals and labels. Other recipes are fish glue, stick-to-glass, Heatstik, and Superstik, an adhesive that will adhere to almost any surface. The body papers used for gumming are wide and varied in furnish; they are received at the converter's mills in large rolls in various widths for coating with gum. The gum is fed into a trough on the gumming machine and coated on to the surface of the paper by means of gumming rollers, after which the paper is carried away on festoons for drying and re-reeling before being calendered and finished. The latest glueing machines dry the paper after gumming by means of a large heated cylinder. Enamels, surfaces, calf papers, kraft papers, tinted papers of all grades, flint and gelatine papers, metal papers, are but a few of the many varieties of coloured and coated papers that may be obtained gummed either from stock or to order.

Gummed papers are suitable for all processes of printing, sizes available are 18 in. by 23 in., 20 in. by 25 in., 20 in. by 30 in. and for the lithographic process of printing, 23 in. by 36 in. or 30 in. by 40 in. may be obtained. Gummed papers are also supplied in coils, plain or perforated at predetermined intervals, in widths to suit machine requirements. Autofeed gummed papers are now made for feeding-in on high speed automatic printing machines. Such adhesive paper 'runs' fast by any automatic feeder, cuts well on the guillotine and behaves perfectly under the press or punches where label work is being produced. Special double seal gummed paper with a strong adhesive is made for printed seal and brand label work produced from sheets, wide reels or narrow coils.

In this survey of the various groups of paper and board qualities, it will be seen that paper has been invested with many new and important qualities. It is now made water repellent and water absorbent, untearable and flimsy, many new raw materials being employed in its furnish. The paper mill chemist has made inexhaustable experiments and has helped to produce an ever growing range of speciality papers for all needs and unique purposes.

Machine production has been perfected by the introduction of mammoth machines which now produce new papers at great speeds. The products of the paper maker, in volume, reach from the skies to the earth and cover the entire globe. The endless paper trail is both fascinating and comprehensive in its application.

Food Production Figures

Production figures are often fascinating in that they reflect the trends, development or progress of an industry and the tabulated statistics compiled by the Ministry of Agriculture, Fisheries and Food reflect the trend in the food and allied industries relating to canning packs produced in the United Kingdom.

These figures give the production of canned foods in tons from the year 1951 up to 1958; current figures are in course of compilation. The figures for the first quarter of 1959 are as follows, but their subdivisions are not yet available:

| | | | |
|-------------------|---------|---------------|--------|
| Canned Meat | 15,300 | Canned Fish | 2,400 |
| Canned Vegetables | 129,000 | Canned Fruits | 10,800 |
| Condensed Milk | 36,500 | Canned Soups | 39,900 |

The Monthly Digest of Statistics compiled by the Central Statistical Office and obtainable from H.M.S.O. is available to the packager and this gives production and consumption figures of foods and beverages in tabular form. Some trade journals publish facts and figures relating to output. British canned food exports are small in relation to production but our imports are considerable. The figures of imports and exports of all commodities are published in the Monthly Trade and Navigation Accounts of the U.K. also obtainable from the H.M.S.O. by those who are interested in facts and figures.

One of the latest developments in beverage packaging is that of canned beer and while no figures are yet published officially the development of packaging in this field is bound to grow with the course of time. In the year 1958, the only beverage to be canned was in fact beer. The Brewers' Society state that of the total output in Great Britain, 38 to 40 per cent volume was packaged in either bottles or cans. Further figures are awaited with interest as the trend in canning grows. The paper and board industry is geared up to meet the ever expanding requirements of packaging coming from whatever quarter it may and new materials are being constantly introduced to meet some new purpose, need or application in the packaging of foods and beverages. Most of these specialized papers and boards whether they be coated, laminated, reinforced or impregnated with some special formulae have been produced as a result of the contact made by the packager with the paper maker and the converter. It is only by an interchange of experience, requirements, skill and knowledge that these new papers can be made, perfected and ultimately produced to the benefit of all industries everywhere.

UNITED KINGDOM CANNING PACKS

Statistics compiled by the Ministry of Agriculture, Fisheries and Food from information supplied by canners

Weight of contents, in tons of 2,240 lb.

PRODUCTION OF CANNED VEGETABLES

| | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 |
|-----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Processed dried peas | 119,800 | 137,700 | 117,700 | 156,000 | 155,600 | 187,900 | 162,600 | 184,500 |
| Fresh peas | 33,500 | 34,900 | 42,300 | 47,500 | 64,800 | 59,100 | 59,000 | 52,800 |
| Beans in tomato sauce | 94,200 | 109,800 | 111,900 | 118,000 | 131,300 | 160,600 | 158,500 | 172,100 |
| Macaroni and spaghetti | 20,500 | 19,000 | 20,200 | 16,400 | 19,800 | 26,900 | 27,600 | 28,700 |
| Carrots | 12,900 | 16,000 | 13,200 | 12,700 | 23,000 | 24,700 | 21,000 | 29,600 |
| Spinach | a | a | a | a | 400 | 800 | 800 | 500 |
| Celery | a | a | a | a | 1,100 | 700 | 1,400 | 1,600 |
| Runner and french beans | 1,700 | 1,700 | 3,600 | 4,400 | 2,900 | 3,400 | 6,100 | b |
| Macedoine | b | b | b | b | 7,400 | 9,200 | 7,000 | 7,000 |
| Beetroot | b | b | b | b | 3,000 | 4,300 | 4,500 | 3,600 |
| Turnips, swedes, parsnips | b | b | b | b | 500 | 300 | 500 | b |
| Butter beans in brine | b | b | b | b | b | 10,500 | 7,600 | 10,300 |
| Broad beans | b | b | b | b | b | b | 6,700 | b |
| Other vegetable packs | 17,200 | 19,600 | 23,100 | 18,700 | 19,800 | 15,800 | 7,900 | 18,200 |
| TOTAL CANNED VEGETABLES | 299,800 | 338,700 | 332,000 | 373,700 | 429,600 | 504,200 | 471,200 | 508,900 |

a. Included with runner and french beans.

b. Included with other vegetable packs.

PRODUCTION OF CANNED FRUIT
(Indigenous and imported fruits canned in the U.K.)

| | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 |
|------------------------------------|--------|--------|--------|--------|--------|--------|--------|---------|
| Plums, damsons, greengages | 37,600 | 32,500 | 10,300 | 21,500 | 20,400 | 24,400 | 9,200 | 15,100 |
| Apples | 8,400 | 8,300 | 8,700 | 9,400 | 8,300 | 10,900 | 8,500 | 9,600 |
| Strawberries | 5,300 | 7,000 | 6,900 | 9,800 | 6,000 | 5,200 | 5,900 | c |
| Gooseberries | 6,900 | 5,700 | 2,800 | 3,700 | 6,500 | 7,000 | 4,300 | 7,500 |
| Other berries and currants | 5,000 | 6,700 | 4,400 | 4,300 | 2,800 | 3,800 | 5,300 | 6,300 |
| Rhubarb | 3,700 | 4,500 | 2,300 | 4,600 | 5,500 | 5,400 | 4,800 | 10,300 |
| Cherries | 5,700 | 6,200 | 1,700 | 2,000 | 2,200 | 4,200 | 2,100 | 3,600 |
| Apricots | c | c | c | 4,800 | 1,300 | 600 | 600 | 900 |
| Peaches | c | c | c | 3,200 | 5,600 | 4,900 | 7,900 | 6,400 |
| Pears | c | c | c | 9,700 | 11,500 | 8,800 | 6,800 | 3,900 |
| Fruit salad | c | c | c | c | 17,000 | 18,100 | 19,000 | 18,300 |
| Other fruit packs | 3,600 | 9,200 | 35,400 | 16,800 | 3,500 | 3,400 | 2,900 | 16,900 |
| TOTAL CANNED FRUIT | 76,200 | 80,100 | 72,500 | 89,800 | 90,600 | 96,700 | 77,300 | 98,800* |

c. Included with other fruit packs.

*Not including bottled fruit (about 3,600 tons).

PRODUCTION OF CANNED SOUPS

| | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 |
|----------------------------|--------|--------|--------|---------|---------|---------|---------|---------|
| TOTAL CANNED SOUPS | 72,000 | 88,800 | 86,200 | 100,900 | 123,400 | 129,200 | 154,300 | 154,900 |

PRODUCTION OF CANNED MEAT

| | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 |
|---------------------------------|------|--------|--------|--------|--------|--------|--------|--------|
| Ready meat meals | d | d | d | 9,200 | 14,200 | 16,600 | 16,800 | 26,200 |
| Tongues | d | d | d | 1,700 | 2,100 | 2,900 | 3,000 | 3,200 |
| Meat roll and galantine | d | d | d | 3,400 | 4,500 | 5,500 | 6,600 | 4,300 |
| Sausages | d | d | d | 4,200 | 2,400 | 3,700 | 3,000 | 2,300 |
| Bacon and ham | d | d | d | 5,400 | 4,900 | 4,300 | 3,100 | 3,700 |
| Other meat packs | d | d | d | 2,300 | 3,300 | 3,400 | 5,000 | 6,100 |
| TOTAL CANNED MEATS | d | 34,800 | 31,000 | 26,200 | 31,400 | 36,400 | 37,500 | 45,800 |

d. Information not available.

PRODUCTION OF CANNED FISH

| | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 |
|---------------------------|----------|----------|--------|--------|--------|--------|----------|----------|
| Herring | <i>d</i> | <i>d</i> | 7,400 | 8,900 | 7,800 | 8,400 | 7,900 | 6,200 |
| Pilchards | <i>d</i> | <i>d</i> | 2,300 | 1,300 | 2,500 | 2,700 | <i>e</i> | <i>e</i> |
| Other fish packs | <i>d</i> | <i>d</i> | 1,300 | 1,400 | 1,700 | 2,300 | 4,000 | 5,100 |
| TOTAL CANNED FISH | 16,800 | 20,400 | 11,000 | 11,600 | 12,000 | 13,400 | 11,900 | 11,300 |

d. Information not available. *e.* Included with other fish packs.

PRODUCTION OF CONDENSED MILK

| | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 |
|-----------------------------------|----------|----------|---------|---------|---------|---------|---------|---------|
| Full cream unsweetened | <i>d</i> | <i>d</i> | 67,600 | 54,900 | 100,800 | 111,800 | 103,700 | 112,800 |
| Full cream sweetened | <i>d</i> | <i>d</i> | 35,400 | 42,300 | 51,200 | 56,900 | 53,700 | 44,400 |
| Machine skimmed sweetened | <i>d</i> | <i>d</i> | 35,100 | 18,200 | 25,400 | 22,500 | 24,600 | 21,900 |
| TOTAL CONDENSED MILK | 86,400 | 114,000 | 138,100 | 115,400 | 177,400 | 191,200 | 182,000 | 179,100 |

d. Information not available.

CHAPTER 15

Light Mechanical Handling Appliances for Storage and Merchandise Movement

CONSIDERABLE research and effort has been expended in connection with all devices specially designed for the more efficient handling of all kinds of materials such as containers, cartons, boxes, paper and board supplies, adhesives, liquids and solids, both before conversion or filling or in some initial state in the chain of manufacturing process. In addition to the re-styled and improved types of mechanical aids now available to the food and beverage packager and packer, specially designed apparatus may be planned and made to suit local conditions, confined spaces of movement and turn-round, and narrow gangways, making use of wall space and height. The new fork lift truck simplifies the stacking operation and allows maximum use to be made of even the most limited area of floor space. Costs of all materials and labour continue to rise so that every facet of production must be considered by the responsible executive with a view to making all the economies possible without at the same time affecting the general high standard of food and beverage production or its method of presentation. The more efficient handling of raw materials of all kinds in the store, warehouse, to and from the production line, their handling when filled, back into batch store or on to the despatch or delivery section is one of the factors which has to be considered. The speeds of processing or filling plants have also to be considered if the raw materials are to flow speedily and in the right quantities. Hold ups in the flow of merchandise must be avoided.

There are still many plants and factories which have been developed rather than planned and in some instances it is still a case of goods manhandling instead of some suitable mechanical device. Judging by the progress and increasing popularity now current in the field of mechanical handling, some firms are examining this subject—an important chain in the process of manufacture in almost every industry—in the light of economy and rising costs. Appeals are now made from high governmental level either to reduce or hold down costs and the more efficient and speedier the handling of materials from beginning to end is one of the most important ways to obtain this desirable result. New techniques and processes of handling have been designed to assist industry from the source of supply of raw materials, through all the phases of processing or conversion, to the handling and delivery of the packed case or container. The very considerable number of move-

ments often involved in handling goods from flow line or bench to store and out again for some additional process or despatch, all add up to forms of handling which cost money and add to price levels. Where goods are continually handled in a process of conversion, certain types suffer damage, however slight. This can add up to a high figure, claimed by experts to lie somewhere between 20 and 50 per cent of the overall cost of production. Thus the saving of only 10 per cent on material handling cost could probably reduce the cost of production by some 5 per cent.

Some Proven Advantages of Handling Devices

There are many advantages to be obtained by the installation of the right type of mechanical appliance, and obviously skilled advice must be sought from the makers and tests made in the manufacturer's own factory under field conditions.

(a) It will be found that both time and cost factors will be reduced as a result of the faster movement of all materials before or after filling or completion. Work can be speeded up and production increased throughout the plant, and waiting time at benches or on the flow line may be reduced.

(b) The possibility of damage to canned, bottled and other food packages by dropping is limited and the corners and edges of filled cases are amply protected.

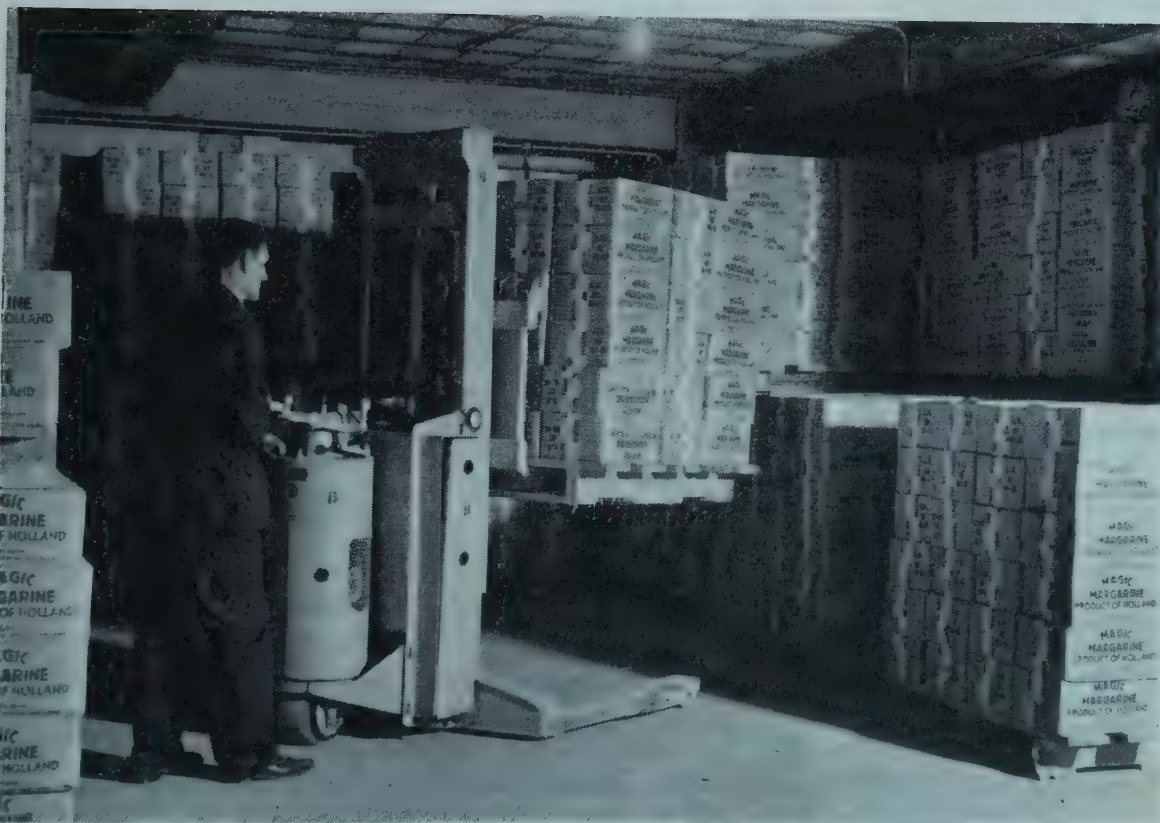
(c) Some kinds of liquids may remain in bulk storage until actually required for filling or packaging into bottles or cans prior to orders received.

(d) The box and flat metal, wood or other types of pallet or stillage may be suitably employed for filling and conveying by fork lift truck along narrow aisles so that full use of floor space is possible. Not a single load need be individually handled manually.

(e) The fatigue of the worker handling loads over extended periods of time can be lessened and accident risk thus lessened.

(f) The fact that the correct quantities may be conveyed to the point of filling, processing or labelling is important and such a plan may well be designed to fit in with production programmes or promised deliveries. Raw materials should be conveyed to operators in such a way that continuous production may be maintained over the working period. Operators should not leave their machines or benches to fetch or carry small supplies of raw material to keep them running.

Wooden cases stacked away on pallets ready for despatch.



Mechanical handling of fibreboard packing cases.

(g) By careful study, the link between store and production line and the operators can harmonize in an even flow of goods as factory efficiency can only be as high as materials handling devices permit.

Where flat packages, cans, drums and packing cases, can be stacked or stored in a 'flat form' the pallet in one of its many forms is ideal and the use of some suitable truck will enable the complete load to be moved without physical

assistance. Tiers of stacked pallets may be moved by the fork lift truck. Storage in this way ensures that every foot of space is used and enables more stock to be stored, marked off in batches, dated or coded. Stocks of bottled produce which require maturing may be left or moved as a whole to another space in a matter of minutes. The entire capacity of the warehouse or store can always be used with the aid of the pallet and the truck.

Hints on Materials Handling

It is important where the installation of equipment is being contemplated, to carry out a survey on the spot in conjunction with an expert. Those who carry out such a survey may well consider the following fundamentals of materials handling:

1. Goods of all kinds should not be moved or handled until they are required for processing or delivery.
2. Goods should be delivered right up to the spot where they are required and in the right quantity, and in this way deliveries will coincide with a planned production flow.
3. It should be possible to deliver goods to machines, benches or operators, thus avoiding costly re-handling of materials; in this way operatives will be able continuously to perform the true work for which they are paid. With the materials close at hand, periods of waiting for supplies by porters are avoided, or alternatively, the necessity is done away with for them to fetch and carry components or materials themselves.
4. Where mechanical devices have been installed, it should be the responsibility of some executives to ensure that they are always in use and employed to the maximum extent. The more materials handled at one time, the lower the cost and the more efficient the running of the establishment.



Lansing-Bagnall fork lift truck and barrel and drum elevator.

5. The link between production units and operations must be studied, as factory efficiency is only as high as material or merchandise methods will allow it to be.

We have approached the time in our industrial life where planned handling of raw materials to the finished product and delivery must be regarded as a part of the actual process of manufacture and, considered along these lines, progress can be made towards greater productivity. Even a gravity roller track might help to speed up flow line, intake or despatch of goods, thus reducing costs or even increasing production.

A word of warning must be sounded to the user of new equipment. In the first place, it is important to see that all those likely to come into contact with or use such equipment should have full working knowledge of the system or apparatus. They should know how to get the utmost use out of the device, however small, and it should be given a fair chance to do its job. There should be no prejudice, as cases have been found, where equipment has been dismantled and put on one side; if in doubt, call in the expert or supplier.

The importance of efficient layout, storage, store-keeping arrangements, goods inwards and outwards facilities and general warehousing arrangements cannot be too strongly stressed. Many of these important sections of what might be considered as otherwise well organized undertakings are areas of confusion. In such instances these sections have developed without any planning as the need for them has grown, a little more space has been taken from here and from there, a constant robbing of Peter to pay Paul. Obviously good handling and conveyancer equipment cannot function at its best and assist to the full in efficient cost reduction under similar poor conditions of factory planning.

A careful survey of the inward and outward goods flow might in some instances prove as rewarding as more efficient equipment in an otherwise well-run factory: short routes, the minimum of handling connections cut out with alleyways, and storage set aside and not encroached upon by other processes, stocks or production overflow. Open space is far better than partitions placed here and there to divide off stores; the modern method of mechanical fork stacking on pallets obviates the use of screens. Once goods are stored away, they should not be moved from place to place to make extra room for a larger consignment. First in should be first out in most processes of food manufacture; it should always be remembered that packaging materials do not improve with handling, especially delicate fancy and coated papers and expensive box lining materials. Extra handling also means added costs.

Whether the plant be large or small, the same fundamental principle applies with regard to efficient layout.

Current Devices for Mechanical Handling

There is a wide variety of equipment available and this may be divided into the following three main groups:

1. Equipment for storage of merchandise such as steel shelving and racking and platforms and the modern system of mobile storage.

2. Various types of containers into which work and materials are placed and moved from place to place. This comprises a large variety of boxes, pallets, skids, trays and similar items. All of these containers may be moved from one place to another by hand truck, fork truck, tractor and other similar means of lifting and transportation.

3. There are a whole series of mechanical handling devices including belt conveyors, chain conveyors, slat conveyors, elevators, hoists, tractors, fork trucks and elevating trucks.

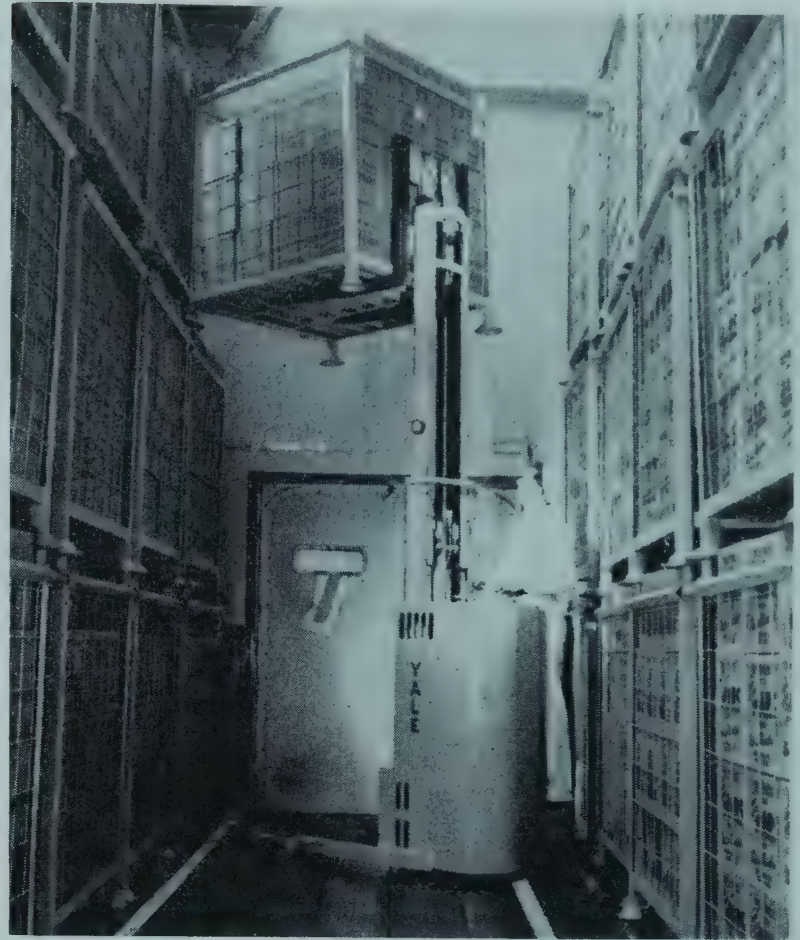
The Fork Truck.—The fork truck is particularly worthy of mention because this piece of equipment has been singled out by several manufacturers for development. Fork trucks consist basically of a mobile power unit which operates moveable forks, and is capable of lifting them vertically from ground level. Although this method of handling is comparatively new in this country, there is a wide range of vehicles in this field. The four basic types of power unit are petrol, diesel, petrol electric and storage battery, all of which have certain merits of their own. Capacities range from 10,000 lb. to 12,000 lb., while the bulk of trucks are in the 4,000 to 6,000 lb. category. Such equipment is capable of effecting substantial saving in labour, for example, on many types of work with a driver only the equipment can do the work of eight to 10 men. Even when making comparisons between fork trucking and power conveyor systems, often the fork truck is proved more efficient because it is infinitely and immediately more flexible, not having to follow a fixed production path. Manufacturers of such equipment make the following claims:

1. Very much lower handling costs of merchandise.
2. A much faster movement of goods from place to place.
3. Reduced packaging costs.
4. The maximum utilization of limited storage space.
5. Likelihood of reduced pilferage.
6. Greater safety for employees.
7. A reduced worker fatigue.
8. Time saving in loading and unloading consignments.

Many kinds of other attachments may be suitably fitted to the fork truck and, in this way, other work may be undertaken. The trucks may be converted into cranes, shovels, or drum carriers, to mention a few of the additional facilities possible, and new fittings are constantly being added to the main equipment.

There is no doubt that fork trucks will become even more popular than they are at present, and their already won popularity has brought with it a demand for auxiliary trucks for intermediate transport to handle pallet loads without being able to stack them, and these pallet trucks are now available in power driven and hand operated models.

Again one of the main advantages of palletized goods is that they can be stacked vertically by means of the fork truck, enabling use to be made of all the available headroom, but the fork truck will need a certain minimum amount of manoeuvring room and 10 ft. wide aisles are usually planned for in a palletized store.



Bin loads are stacked from an aisle only 6 ft. wide with this Yale fork lift warehouser—an electric truck available in capacities of 2,000 and 3,000 lb.

Hand Trucks.—However large the organization, there is in most cases a place for the hand or power operated truck, bin lifter and tilter and similar devices used for conveying limited loads of goods of all kinds from store to bench or from finishing-off department to transport and so on. Many of the modern trucks are fitted with moulded rubber, cushion, sorbo, pneumatic and unpuncturable semi-pneumatic wheels in order to avoid unwanted noise or damage to wood flooring.

Great care should be exercised in the best choice of truck as the great variety available calls for some study of a type to suit the work, material or circumstances. Strength without weight is always an asset in such equipment, shape, size, ease and noiselessness of movement, stability of convertibility into carrying various classes of similar material are some further advantages. In spite of the considerable range of trucks, it may be that one ideally suited to a particular process of condition is non-existent. In this case, the experts are able to design and fashion conveyances to suit special needs and requirements. Care must be taken to ensure that any hand-controlled equipment should not be responsible for slowing down other more highly mechanized parts of a process of production or manufacture. Soundly constructed trucking with first class wheels is most desirable.

An offshoot of the hand truck is the lifting truck, which is invariably employed as an adjunct to merchandise-carrying stillages, etc. Reference has already been made to

some of the various types of lifting trucks used in conjunction with wood or metal pallets which, when inserted under the raised bottom of the stillage with its load, elevates it to a distance of anything up to 6 in. merely by lever control. The load, when lifted in this way, may be transported without very much effort, by hand, to any part of the factory, bench, despatch room or other place of processing. Palletted loads may remain on their pallets if desired and be loaded on to wagons for delivery to customers; it depends upon the type of pallet in use. Pallets may be returned after delivery ready for re-use in the works. The lifting trucks may be used in conjunction with any number of stillages.

This, and other similar systems of trucking are adaptable to most forms of stocks, particularly those used by the printer, paper merchants, box-making, bag maker and other paper converters. General merchandise storage, paper stocks, raw materials for processing, may be stacked on pallets and moved into position and remain piled high. Such stores are quickly made mobile when required by the aid of the truck. In the case of large stores, the fork truck is best suited for high stacking in stores.

Other Truck Types.—In addition to the fork lifting truck, there are in the same family other types of trucks, namely, fixed platform trucks, elevating platform trucks, industrial tractors and special purpose trucks.

Fixed platform trucks may be employed to draw trailers and are capable of pulling good loads; elevating platform trucks may be either low or high elevating types, generally employed to transport consignments loaded on stillages in much the same way as the hand-controlled varieties outlined above; industrial tractors are employed in conjunction with load-bearing trailers so that considerable volumes of merchandise may be transported over wide distances.

Loads for trucking are best planned as units, and this is particularly so in the case of the fork truck, where pallet loads of regular size may be dealt with methodically throughout the day.

The Harbilt low loader electric truck is simple to operate and is a first class piece of equipment for handling and conveying platform consignments. In operation, the steering and controls work by a single handle which steers through a complete circle. A downward motion of handle operates lower speed switch; a further movement operates 'full speed'; an upwards movement cuts off current and applies the brake. The current is cut off and the brake is applied automatically whenever the handle is released. The forward reverse and 'off' positions are controlled by a conveniently placed switch handle. The stillage which serves as the base on which to assemble loads for this equipment, such as bags of raw materials, cartons, barrels, boxes and the like in a unit load, may be constructed of durable, semi-durable, or expandable material. The carrying capacity is one ton and the loader is fitted with ball or roller bearings and rubber tyres which are easily replaceable when worn. This and similar equipment in the same field is operated by one man.

Palletization

Having dealt with the various means of trucking, both of the simple hand-controlled and power-controlled types, let us turn to the important subject of palletization, which means so much to the factory handling paper and paper products. The pallet, tray, stillage, platform, or similar unit is most adaptable to the paper and allied trades, especially where flat reams of paper or board are concerned. The hand pallet truck, the fork truck or the tractor-drawn trailer, whichever is employed, all combine in their separate ways with the pallet to form an almost unrivalled system of storage and easy movement of materials. The wide variety of materials that may be palletized, the extreme flexibility of the entire system of procedure, the full use that may be made of the third dimension in storage and the principle of the load with its attendant simplification of stock checking, are a few of the important advantages to the user of this system of paper handling.

For those who may not be entirely familiar with this system of paper handling, a pallet (one of the names employed for a large variety of similar platforms), is a bed, made of one or other sort of material, with legs so that its flat platform is raised from the ground level. Palletization is the act of placing goods of many kinds flat on to the pallet surface. Loaded pallets may be then picked up, moved from place to place, transported by various means along distances or moved to benches or machines for their loads to be processed, or stacked away by means of a truck of some kind and stored until required. For use in the food and allied trades, there is some standardization of style; here pallets are usually made from hard wood or metal. They stack well when not in use and when loaded with supplies, keep them off the cold floors and ensure a current of air passing underneath the stacks. Pallets vary from a simple tray to a specially designed bin. In this case, finished goods may be stocked ready for despatch and sent out in their palletized state, it being possible for the pallet to be returned, collapsed flat, and re-used time and time again.

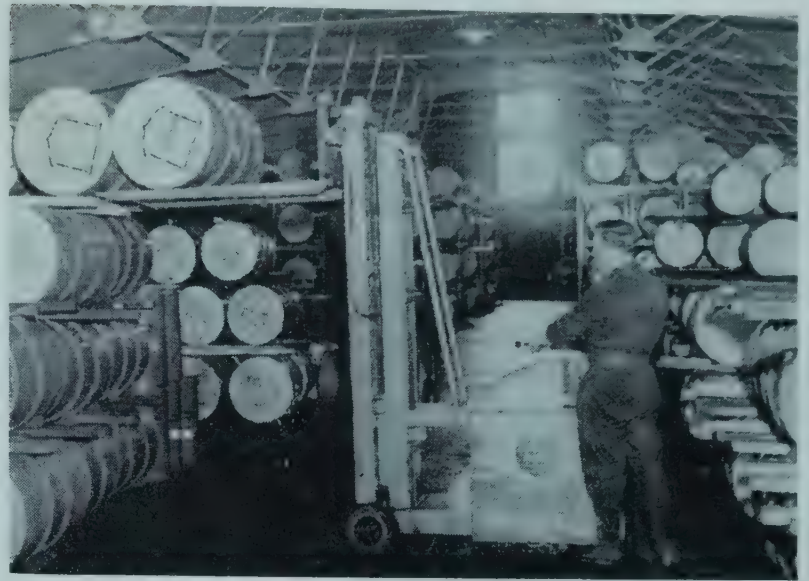
Types of Pallets in Use.—Pallets may be broken down into three main groups:

1. Single or double faced; two way, four way or eight way entry pallets which may be designed for use with hand pallet trucks as well as power fork trucks.
2. Many forms of open framed pallets which are sometimes called stacking frames as they consist virtually of a base member to carry the load and vertical member which enables the pallets to be stacked without goods being crushed.
3. Box pallets which have a floor, and sides and ends which may or may not be detachable. Such pallets are used to house articles of a loose kind of the type which could not be readily stacked and would otherwise prove difficult to handle.

There are infinite varieties of sizes and types within these three broad classifications, but some degree of standardization has been planned in order to meet standard sizes of vans, transport vehicles, railway wagons, etc.

In some cases, certain goods are ordered and specified to be packed and despatched by pallet of some suitable kind in much the same way as paper may be despatched from the mill in battens, in order, for instance, to protect the delicate surface of coated papers. The idea has been mooted of a pallet pool and when this stage has been reached, true palletization will have arrived in an important, useful and comprehensive way to assist the manufacturer and merchant.

Without doubt, the general trend today seems to be towards the extended use and development of the pallet for storage, mobile loads of all kinds of merchandise, and towards the unit load system of palletization and this means a predetermined bulk or quantity of goods to be handled on one individual pallet. Such loads may be regular items, such as flat reams of paper or board, or the load may perhaps comprise of a number of irregularly or awkwardly shaped packages. Such loads will obviously be pre-assembled and pre-strapped and the fork truck will be able to deal with the pallet as a unit load and, as such, it will not be



The fork lift truck for barrels.

broken down until either reaching its final destination. The experts tell us that the unit building principle of palletization gives the lowest cost per piece handled. As we know, from our survey of the pallet system, pallets are used both inside the factory for many store and conveyancing purposes; also, goods are now being despatched on pallets and the idea is rapidly growing, as it obviously must effect some economies in both packing and handling and, of course, greatly reduces any risk of damage. As pointed out, therefore, forward planning should be made in order to ensure that the type of pallet chosen is suitable for the general run of transport vehicles.

While as a general rule the fork truck or hand controlled trolley works in very well together with the pallet system, it is not always possible to use fork trucks, or sometimes the container equipment has to be suitable for use with fork trucks and with lifting trucks, and for each purposes skid platforms, skid racks and skid boxes are very widely and successfully used. Another important point which must be borne in mind is that it may be often uneconomic to transport a pallet load of goods by fork truck from one point to another and then return the fork truck to its starting off point without a return load; in such cases it might be more economic for the goods to be handled by gravity tracks or by power conveyors.

This all points to the fact that it is rarely possible to arrive at one solution of handling problems in any one factory. Each case must be treated as a 'case' where the right sort of equipment is installed by the expert. Sizes, weights and bulk to be moved, distances to be traversed and other details must be considered.

Roller Conveyor Systems

The installation of one of the many excellent roller gravity conveyors provides one of the most efficient and economic forms of transporting and conveying raw materials and finished products. Packages ride over the rolls to their destination and practically every kind of load may be so conveyed provided that the roller conveyor has been suitably built with a firm and flat surface. The roller



*Lodematic Auto-Loader
which lifts automatically
up to 10 ft.*

conveyor, which consists of any number of revolving cylindrical rollers mounted in angle iron sideframe supports, may be constructed on the floor of any suitable part of the building or it may be suspended at a height from above by hangers or steel work. Standard sections or complete units are in the ordinary way supplied by the specialist, the rollers themselves varying in diameter from $1\frac{1}{2}$ in. to 3 in. or more if desired. The bulk and weight of the goods will decide the spacing and pitch of the rollers. Where necessary, guard rails may be built to prevent goods falling from the conveyor. Junctions and switches may also be provided in cases where converging lines are employed.

One of the popular usages for the roller conveyor is in the packing and despatch departments where the goods are packaged and sent forward from the packers on to the roller conveyor which takes them on to the weighing department and so to despatch. Additional lengths of rollers may be added to fit on to the backs of vans and loading wagons so that goods from the packers may be sent straight through on the conveyor and actually into the van.

One standardized belt conveyor system for transporting packing, assembling and processing work is the 'Flowline'. The chief advantages of such equipment lie in its adapta-



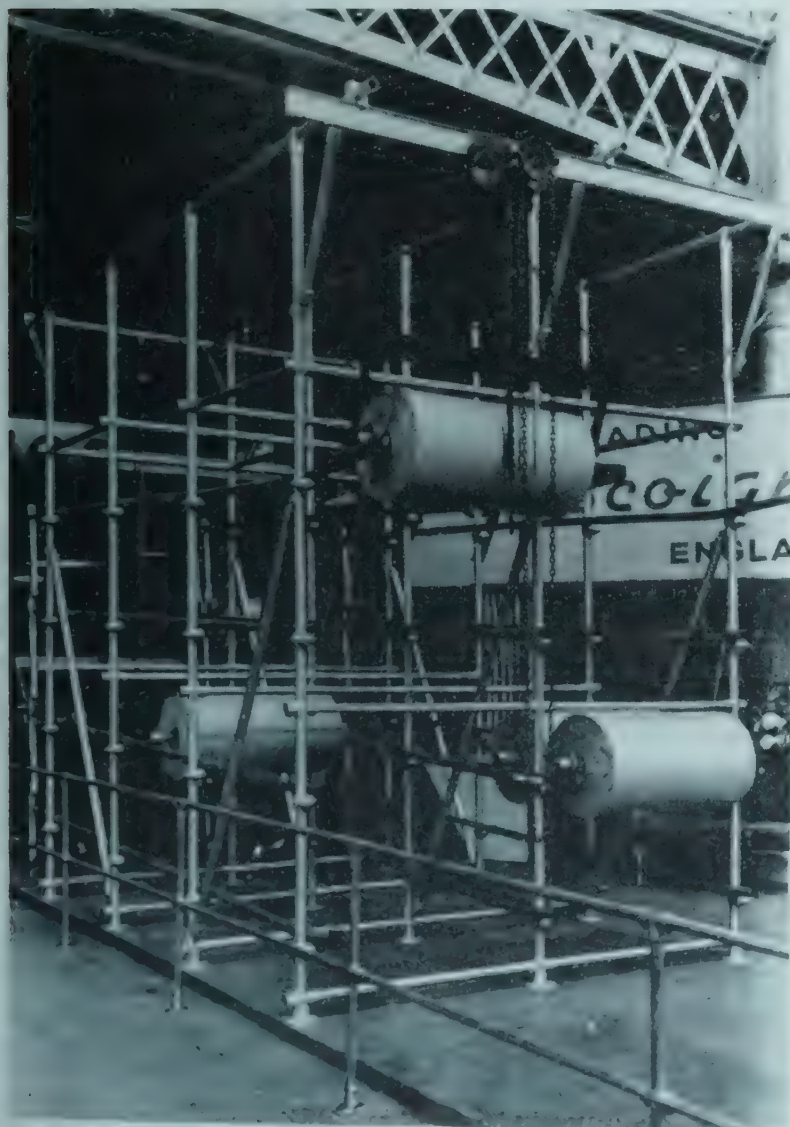
Drum and barrel stacker.

bility, standardization and ease of erection. Any combination of packing, assembly, process work or plain conveying can be accommodated on this unit. Such features prove most invaluable during times of rapidly changing manufacturing plans and processes.

The conveyor can be built up in two forms. Firstly, as a light duty conveyor with the belt carried on skid plates; secondly, as a medium duty conveyor with the belt carried on ball-bearing idlers; the same intermediate sections are used for either type. All sub-units are pressed from sheet steel which combine lightness with strength and provide a smooth clean exterior free from projections. From the standard sub-units, additions, removals or substitutes in other units are merely a matter of being able to handle a screwdriver and a spanner. The driving unit consists of a steel frame unit, which carries the driving mechanism. The whole of the working parts are completely protected by the pressed steel guards which form the driving unit case. The conveyor system is fitted complete with troughs, stands and slide bench brackets, foot rails and side tables and under-shelves. It has a four speed range.

It is important to plan how work is fed both on and off the conveyor system to ensure an even and smooth flow of work to all operators at a time. In planning such equipment, it is also a matter of importance to decide the effective length of conveyor required, the electric supply available for the running of the unit and the nature of the work to be done.

Spirals and Chutes.—Where a process of assembly or work is carried out between two floors, the roller conveyor spiral is a useful adjunct for transporting merchandise from one level to another. As the term implies, a suitable number of curved sectional spiral rollers, mounted and contained in side arms or some similar framework, complete the job. Junctions at half way or other positions may be arranged, so that parts or goods from floors on the way down may be linked up with the scheme. Space is often a factor in planning



Tubular sectional racking for barrels, drums and roll stacking.

these facilities of movement, spiral chutes in particular, taking up a fair amount of room.

Other Conveyor Types.—There are many other types of conveyors used in various kinds of factories handling heavy packages and bulky goods. Slat conveyors are for really heavy work and those factories handling casks and barrels of liquids, large wooden crated objects and goods, metal drums and the like, favour this form of conveyor. Then there are the systems of overhead chain conveyors most useful for transporting merchandise from one point in the factory to another. Overhead chain conveyors are simple and most economical to operate and their application in industry is wide indeed, as they may be employed to handle the majority of goods or their components. Perhaps the easiest method here consists of a closed circuit of monorail tracking under which runs a continuous chain connection to trolleys at regular positions; to these trolleys are attached hooks, suspended trays or some other suitable adjunct to merchandise carrying. An electric motor drives a sprocket wheel which engages with the links in the chain.

The Hoist

The continuous handling of bulk merchandise of varying weights and sizes received or taken from a static position and in somewhat confined areas of space, calls for the employment of some kind of hoist. There are hand-operated chain, air and electric types, the spur gear and the worm gear pulley blocks being popular and effective. The spur gear hoist has proved that it will raise the heaviest weight at the lowest possible expenditure of effort and is considered an extremely efficient device for intermittent service; on the other hand, worm gear hoists are portable and light and adaptable for light work.

The Barrel, Metal Drum or Roll Grab

This is a comparatively recent and important device specially made for dealing with roll or circular type merchandise; it has in fact a ready application in the paper industry where it will successfully deal with the handling of large rolls. Paper and thin board material in this form often find their way into the medium to large packager where such materials may be used for box making, lining, covering, wrapping, packaging or labelling the product. The roll grab will handle circular merchandise of this kind in a vertical position and place it into specified positions in the store, or production plant, or in the vicinity of the packaging plant or other machine. The grab is so designed that roll merchandise or paper rolls may be elevated from the flat to the horizontal position so that vans and trucks may be unloaded or loaded with ease. Other types of fork lift trucks are also capable of handling and stacking drums, barrels and rolls of various kinds of merchandise. The special 'through' type of metal or tubular racking which may be quickly and easily installed enables merchandise to be loaded into one side of such a fitment and gravitate to the other side for the purpose of unloading whenever required.

Wire Mesh Containers

The use of wire mesh containers has many advantages. Made from steel wire mesh, almost any shape or size may be made to suit a particular process or manufacturing scheme. The elasticity of the material lends additional strength to the general construction which is somewhat robust for most kinds of usage. The greater variety of these containers and crates may be collapsed when not in actual use so that space is not a handicap in the use of such containers.

Containers or crates fall into two distinct groups, those used within the factory in the general manufacturing or conveying plan of production and those designed to be used for deliveries outside—sometimes called transit crates. Made from mild steel wire or rod-welded in the shape of square mesh, the gauge of wire used to form the mesh generally bears some relation to the ultimate use of the container, this varies from 3/16th to 5/16th of an inch in diameter. In general the wire mesh varies from about one to four inches square. The finished mesh is usually protected against wear and rust in outside usage by such means of galvanizing or some protective paint.

These crates are lifted by fork truck devices. The crates may be designed to hold up to 30 cwt. of goods stacking five in height when fully loaded. The visible nature of the wire mesh container or crate assists in the immediate identification of goods and enables a physical stock check when required without very much difficulty. If part contents are desired, the specially panel-constructed containers may be opened quickly as they are hinged and the individual panel may be dropped. The solid rigidity of these mesh crates enables even the most fragile goods to be housed and conveyed within their compass and the stacking process will not cause bending or collapse. Some of these wire mesh crates have legs to assist the fork truck operation and storage and they are always ready to be conveyed elsewhere. Transit crates do not as a rule carry the additional legs and stacking by fork truck is not possible, but they may be stacked in the ordinary way by hand or hoist. Handles for such operations are normally fitted.

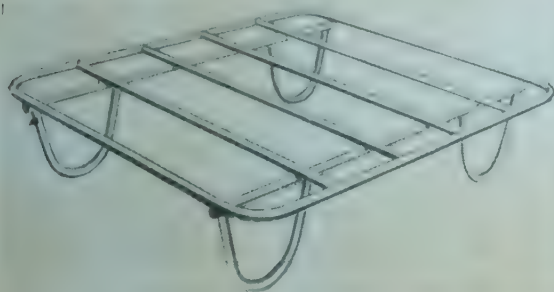
There are a number of devices used for the closure when the crates or containers are filled. Padlock or seal is the most common method of steel strapping and similar wiring devices may be used.

Box containers, crates and box pallets are, in the main, used for fragile products such as may be made up from paper and board material and other items which would not stand up to crushing.

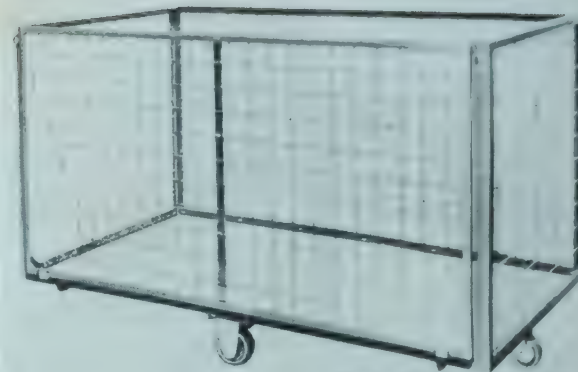
Electronics Mean More Production

It is worth recording in this chapter some reference to a paper read by an executive of the British Electrical Development Association on the all important subject of electronics in materials handling. This was one of a series of lectures given at a convention held during a recent Mechanical Handling Exhibition.

The application of electronics to industry is one of the keys which will give the fast production required from the



Above: The steel pallet and on the right the mobile wire box storage pallet.



The open-end wire box pallet.

factories in the future. What might be considered as a revolution in industrial techniques is required and an understanding of the vista opened out by the application of this new branch of science to industry is essential.

In his talk, the speaker expressed the thought that considerable time was spent on the evolution of the product in all its phases of production and packaging, but little or no real thought was given to the final operation—that of handling the goods. This must now be considered as part of the process of manufacture. Mechanical handling, to be really effective, must be considered and planned at all stages of manufacture, storage and despatch. It was pointed out that the addition of a simple lug in a casting of lifting point in a metal pressing might possibly cut costs in half from the point of view of handling and thus reduce proportionately the cost of manufacture. There can be no doubt that consultation at this point is vital between manufacturer or merchant and mechanical handling expert if the best results are to be obtained.

In his talk, the speaker described in full detail quite a number of typical applications of electronics to industrial processes, many of which have an application in the paper and allied trades. He mentioned, for example, the automatic stamping of the outside of the packing case. An arm with the stamp at its end was pivoted at the side of a slat conveyor. In the progress of movement, the arm was operated by the breaking of the light beam by each case. At the same time, the light cell could be made to stop the conveyor, or, on the other hand, to sound an alarm, this being employed for the purpose of preventing bunching or to detect a stoppage on the conveyor system. An appropriate time-delay mechanism could be incorporated so that the travel of an article through the light beam would not operate the mechanism. On the other hand, when the beam was interrupted for a period longer than normal the conveyor was automatically halted.

In certain processes of manufacture the light cell could be designed for the purpose of inspection. An example of this kind occurred after the filling of containers with powder: a light cell received the light, detected inefficient container filling, either from over- or under-filling, and did not then pass the impulse required for the machine to seal

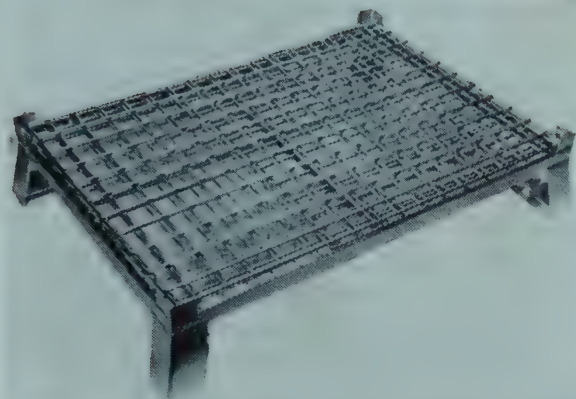
the flaps. In this way, correctly filled containers were sealed, while any under- or over-filled containers were removed from the conveyor. Quite a few of the necessary inspection operations could be made automatic, e.g. the viewing of small diameter holes and drilled passages in machine parts could be readily inspected by means of a light cell inspection jig. Paper and metal strip could be continuously examined for holes.

One of the more important features is that electronic equipment does not become fatigued so that consistently high speeds were possible. In most undertakings where the human element is completely involved, sound, sight, and touch may suffer as a result of fatigue and mistakes may creep in.

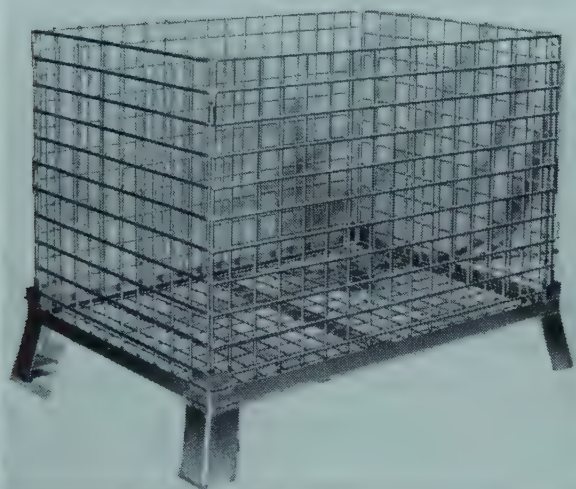
Electronic control of a machine or a process of production is operated by a simple knob and all adjustments can be made in the same manner. It can also be claimed that the correlation of processing and handling in a plant lends to uniform flow and many other desirable results, for example, increased productivity, reduction of interprocess stores to a minimum, elimination of bottlenecks, a continuous overall rhythm of the production line, reduction in accidents to personnel and their better utilization, better planning of floor space and less wastage.

The Hydram Handling and Stacking Equipment

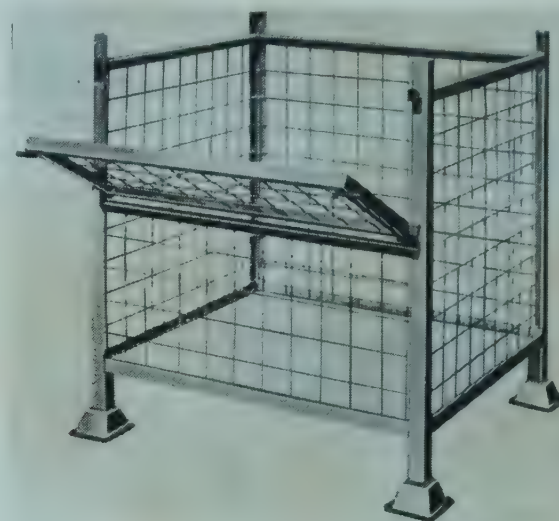
Various types of lifting, shifting and loading equipment made by Hydram (distributed by Kenton Equipment Ltd.), are most suitable for dealing with paper reels or rolls, drums and casks, bales and crates and loaded pallets and for use in limited spaces in the goods yard, factory or place of storage. Particular mention may be made of the Model L.P. Hydram which is a mobile machine designed for loading and unloading heavy goods of this kind. The Hydram loader is built specifically for 'straight' loading and unloading, can be driven by main electric, petrol engine or battery, and lifts 7 cwt., 4 ft. 6 in., in 5 seconds. It is claimed that this is the fastest and most economical appliance ever produced for this purpose. It is also claimed that it will achieve an immense saving in space, labour costs and time and that the initial cost of such equipment may be reasonably quickly covered. It works



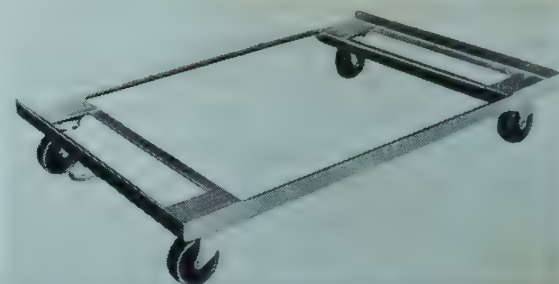
◀ *The collapsed wire box pallet.*



The movable frame pallet. ▶



The static box for storage (above).



◀ *The collapsed form of pallet open for storage.*

with ease and goods flow from ground to loading level, or *vice versa*, in an uninterrupted stream without any strain or danger to operator or to the loads themselves. In modern equipment design and manufacture, these two most important features have exercised the skill and careful thought of all mechanical equipment manufacturers.

The following are the power-operated models: LP 7 to lift 7 cwt. from ground level to heights from 3-4 ft.; LP 10 to lift 10 cwt. from ground level to heights from 3 ft. 6 in. to 4 ft. 6 in.; LP 15 to lift 15 cwt. from ground level to heights from 3 ft. 6 in. to 4 ft. 6 in. An extension piece can be provided for the LP 7 giving an additional 6 in. lift. The electric motor is flame-proof according to requirements.

The hand-operated model LPH 7 is worked independently of any kind of power and does exactly the same kind of work as the power-operated type but naturally takes longer in the process. The load is pushed on to the cradle of the equipment which is only three inches high. With a press of a pedal, the load is raised in five seconds to the level desired. At this stage, the load is then immediately rolled or pushed on to the lorry stack, conveyor, bench or place of storage. In addition to rolls and reels, bales, barrels and casks, it is claimed to handle crates and containers of every kind at the rate of one ton per minute.

When in use the machine rests on the ground to ensure minimum initial loading height and maximum stability. It can be raised on its rubber-tyred roller bearing retractable undercarriage, and easily moved about the yard or works by one individual, however inexperienced. It is therefore fully mobile in every sense. For drum, roll, reel, barrel and similar tiering operations, attachments are available which

provide a method of tiering drums or reels up to three high, or as the case may warrant in relation to diameter and space. For drum, roll and reel loads that must not be tilted, Model LPP has been designed. It is often essential to consider loads 'this side up' for many obvious reasons and this equipment will raise 7 cwt. from 3 in. loading position to 4 ft. 6 in., and can be halted at any intermediate level. A hydraulically operated tricycle undercarriage allows for easy mobility as for the Model LP. Load capacities are up to 15 cwt.

Stillages.—This firm's stillages are specially designed to accommodate the maximum amount of rolls, drums or barrels in a minimum space, the merchandise resting at a slight angle to facilitate handling or, in the case of drums containing liquids, to assist draining. They are made of steel and give long service and hard wear. The standard models are available with one, two or three tiers for holding from one to six items in each tier. Special designs may be made according to requirements. Heavy rolls or barrels can be nested up to three high, providing the most compact storage possible where individual replacement is required. The Hydram stillages work very efficiently in conjunction with the loading and stacking equipment outlined above.

Roll, Barrel and Drum Lifter and Dispenser.—Yet another piece of equipment by the same firm is the barrel and drum lifter and dispenser, which is designed to lift and pour glues, gums, adhesives, inks, coating mixtures and similar fluids. Sixty gallon barrels or drums may be lifted easily and quickly, the barrel being rolled on to the cradle, which

takes but a moment. At a touch of the lever, the barrel is raised in a few seconds; safety locks automatically engage during lifting. Rollers in the cradle allow the barrel or drum to be rotated; the fluid is then dispensed easily and accurately, without waste of material or any overflow mess.

Of very robust girder construction, the Hydrum barrel or drum lifter and dispenser works with a load of 7 cwt. as a maximum. It weighs only 2 cwt. and is less than 5 ft. long and 2 ft. wide, standing 3 ft. off the ground. A wheeled model of the Hydrum is also available. Extra high lift models up to 4 ft. lift can be supplied. This firm also produces a special pouring spout with a large aperture which is useful for quick dispensing if required. It is fitted with an air vent and made of aluminium or acid-resisting alloy.

Pallets for Paper Supplies

Some attention is paid to the design and the material used in the construction of pallets in order to render them more serviceable. There is a large variety of pallets and users should examine the latest styles now being produced by the manufacturers. The development chiefly lies in the box pallet types of equipment where the varieties are such that any kind of product may be carefully and efficiently dealt with. Box pallets are for loads of every kind that are in need of protection during handling and conveyance, or such as will not stand the weight of high stacking above them. Fragile merchandise, cartoned goods, awkwardly shaped articles and spare parts are some of the items which call for use of the box pallet. In this field, wire mesh and many other types are made to suit the goods. Boxmakers will find this style of pallet very suitable for their class of work.

Post pallets are also for awkward shaped loads that will not stack on top of each other without damage. The basic pallet is constructed to any required height by means of suitable interchangeable extension posts. Retaining rails or sides may be hooked on at varying heights so that unsteady loads may be prevented from falling in store, in transit or during processes of production.

Where really heavy goods are concerned, the steel pallet is to be recommended and certain minor but nevertheless important refinements have taken place in recent years. Where goods are in constant flow daily from place to place, store to van and so forth, the steel pallet comes into its own.

Still further developments can be expected in mechanical handling equipment in the near future as a result of both the last Mechanical Handling Exhibition and the more recent formation of an Association concerned with the more efficient dealing with goods at all stages of manufacture, store and delivery.

Importance of Planning Factory Space

It is one step in the chain of development to install plant for mechanical handling and another to ensure its constant and efficient use. Various pieces of equipment fit in very well with flow line methods of production while other devices work efficiently as a unit. On the other hand,

certain equipment combines the ability of constant production methods and the unit load system of conveyance. There is a technique, and this may be where the expert can be called in, which endeavours to 'feed' flow line production units in the large organization and yet may be broken down into smaller parts for use in confined space in smaller areas. The flow of materials should be studied at all stages so that the most suitable equipment is brought into use at the most appropriate place in the long line of conversion, or where the flow of material from the areas arrives in a half processed state or goes off processed, printed, converted at the end of the operation.

It is not infrequent that larger organizations not only plan, but also design those pallets and stillages which are best suited to the type of product or work in process.

Hold-ups should be avoided and the planning of gangways is most important when mechanical handling equipment is in use. All gangways must be wide enough to accommodate fork lift trucking, especially where they are planned to allow for two trucks to pass one another. The width of gangways should correspond to the passage of traffic, thus avoiding a general slowing up of the various processes of conversion. The floor space taken up with storage and the gangway available to their movement is most important and it may be better designed on the lines of higher stacking with the aid of mechanical handling devices. It must always be remembered that manual handling of merchandise adds nothing to the value of the product in cash or finished processing; the net return under such circumstances is added cost. Inefficient space planning with mechanical handling devices is almost as bad as plain 'picking up and putting down' of goods. In other words, materials or mechanical handling is the real link between production operations, and factory efficiency is only as high as materials handling methods will allow it to be as a result of planning factory space.

In the U.S.A., much progress has been made in all phases of mechanical handling and the full benefit is felt by the complete co-operation of manufacturer or shipper of merchandise and the carrier. To make it more effective in this country transport organizations must co-operate in the various schemes prevailing in industry. It has been established that the unit load and for lift truck system of handling goods of many kinds has proved its value, but in order to get the full advantage of such methods road and rail transport systems must play their part. There is, indeed, a deadlock until arrangements are made and transport organizations are themselves equipped to deal with manufacturers' unit loads, returnable pallets and other specialized systems of deliveries of goods.

Box and Production Trucks

Returning to our final survey of handling equipment best suited to the paper and printing trades, a recent catalogue issued by Industrial Trucks, of Acton, London, W.3, illustrates some useful sliding tray conveyors which are designed to permit entry of trays from either end of the fitment. Constructed in wood with metal runners, individual

trays may be used on benches, and when work has been completed, or trays filled with sheets, boards or similar materials, the trays may be slid on to the wheeled conveyor and passed on for either further processing or completion, on to store, or for packing for transport. The model is simple, yet effective, and the standard size is 48 in. long, 22 in. wide, 42 in. high, a suitable size for turning in a limited bench gangway space. Trays slide in and out quickly and any size may be made to carry any number of trays. Trays are ideal where packaging and paper products have to be processed and they help to prevent unnecessary additional handling of sheets. For certain other paper converting processes, basket trucks could be applied with advantage. Basket trucks with hardwood bases and frames with leather thongs around the top complete with or without opening on one side for quick and easy loading should be of service to boxmakers. Box trucks are also made from fibre and strong wood of light character with metal reinforcements; these are suitable for the carriage of components and small to medium bulky items made on the bench. Fitted with four swivel casters, easy handling and turning is possible. Yet another model truck in this series is the four shelf production truck which may be constructed to suit individual requirements, while the standard model should meet the needs of many trades. The same manufacturers produce a rack stillage—a type of special superstructure which is built up on frames to operate with lifting trucks. Such equipment offers tremendous advantages to a variety of trades for high stacking on stillages, and is particularly suitable for handling bulky, light and delicate loads of finished or processed goods made up from paper and board materials.

Automatic Sheet Feeder

The mechanical handling of paper and board is not, of course, purely confined to receiving, stacking, transporting and delivery of goods. It has an important function to perform in feeding in sheets to various kinds of machinery. A feeder designed for universal application for all types of boards and in many substances is the ideal from the point of view of the paper user and converter. The new Deritend automatic sheet feeder, which may be coupled to various types of converter machinery in the trade, claims to provide a practical solution to the feeding-in problem and possesses almost universal adaptability. It will handle blanks up to 17 in. wide and between 36 and 50 in. in length up to 50 a minute. The loading table accommodates up to 1 cwt. of blanks at one operation while the setting up for processing is both speedy and simple in action. All that is involved in this operation is the setting of the gauges and the adjustment of the gate. The side gauges are adjusted by means of a self-centring screw which runs transversely across the end of the loading table. Any necessary adjustment needed to deal with varying substances of board is effected by a hand wheel above the gate. In the case of thinner substances or weight of board material, fine adjustment may be made and is maintained throughout the run. The setting up, which in

some cases of converter machinery is involved and lengthy, takes rather less than a minute.

The feeding-in action is obtained as a result of powerful suction and this is applied beneath the pile of blanks which withdraws the lowest sheet without any kind of hesitation. The necessary suction is supplied from a built-in pump of the piston and cylinder type, powered by a 3 h.p. motor which actuates the mechanical portion of the feeding-in mechanism. It is stated that when used in conjunction with a single revolution machine, the speed of feeding-in is one sheet or board per revolution; in the case of use with continuous rotary machinery a four-speed gear is incorporated to provide speeds varying from approximately 50 to 150 sheets per minute.

Considerable time and labour may be saved by the use of this new automatic sheet feeding and as this method will cope with all grades and varieties of board at a uniform rate, a steady flow of work is possible. The Deritend Engineering Co., of Birmingham, are manufacturers of many well-known rotary bending machines and boxmaking converter plant.

The importance of considering high labour costs, the possible damage to raw materials by careless handling by hand, the reduced productive ability arising from limited floor space and the fact that goods must be produced quicker and cheaper for the export markets, are all factors which have made the matter of mechanical equipment in the U.S.A. for some years past a factor towards their modern progress. We have been lagging behind in the introduction of equipment but not in design and quality and it would not be an overstatement to say that British design in this field can in many cases give a definite lead.

The Hirst MK11 ET Battery Electric Fork Lift Truck

This entirely new addition to battery electric fork lift trucks has been produced by A. Hirst & Son, Ltd., of Dewsbury. It has a maximum capacity of 2,240 lb., and can be supplied to raise loads up to a distance of 10 ft., the lifting mast being tiltable for three degrees forward and 10 degrees backwards. The standard length of the fork is 36 in. but other sizes can be supplied.

Both the lifting and tilting motions are operated hydraulically, power being supplied by a rotary pump, driven by a 3½ h.p. electric motor fitted in addition to the motor which propels the truck. A 60 in. stroke ram works the lift and the tilting motion is provided by two three-position valves operated by a single lever on the right side of the driver and the operating motor is switched on and off by a contactor linked to the control valve handle. The truck itself is a three-wheeler, having two-wheel driving in front and a single steerable wheel at the rear, an arrangement which, in conjunction with a wheelbase of only 3 ft. 6 in. give a small turning radius (5 ft. 10 in.). Cushion tyres 16 in. by 6 in. are fitted and the front wheel track is 2 ft. 7½ in. Power is provided by a 3½ h.p. traction motor driving through a reduction gear box, differential and bevel gearing. The differential, final drive gear and bearing are all standard

Ford parts. Travelling control is by pedal operating a three-step mechanical contractor designed so that the pedal must be released slightly before it can be depressed into the second and third speeds. This arrangement ensures that the driver cannot start the truck in anything but the low crawling speed. A Young 25-cell, lead-acid battery of 200 amp. hr. capacity is standardized, but a larger type can be supplied to order. Complete with battery, the truck weighs about 5,000 lb. Overall it is 5 ft. 9 in. long, less the forks, and 3 ft. 1½ in. wide. This equipment is noted for its extreme manoeuvring with short overall length.

The Rolaveyor

This new and improved gravity roller conveyor, available in light, medium, heavy, extra heavy and heavy duty types, is manufactured by J. Collis & Sons, Ltd., of London. It is ideal for packages of many kinds, flat reams of paper and packets of boards, bales and parcels of completed merchandise, such as is produced in the food and allied trades. Finished merchandise produced at one end of the plant and required for transit to another department for sorting, counting-off, examination, further processing, packing, labelling, sealing and similar operations may be quickly and efficiently conveyed without handling. It is said that items of packages with flat surfaces should be carried on at least three rollers at any period of its travel along the conveyor, thus the length of the package governs the pitch of the rollers to be used, and upon the maximum weight of the package to be conveyed depends the ball-bearing capacity (there being two ball-bearings to each roller), the diameter of the rollers and their gauge. The roller widths should generally be slightly wider than maximum width of package to be conveyed, but in circumstances where overhang is permissible, rollers shorter than the package can be used.

The load capacity carried by each roller in pressed steel bearings on the Rolaveyor is, light type 30 lb., medium type 60 lb. and heavy type 100 lb. There are curves and special sections if desired and guard rails may be fitted where the gradient and the type of load to be carried warrant them. Other special sections such as junctions, lift-ups, turntables, swingout, etc., can be supplied if required. The improved features of this equipment are safety, cleanliness and absolute ease of assembly.

The stands for this type of conveyor are adjustable to give variants of gradient after the installation is made if so desired, and the number of range adjustments are adequate for all types of conveyance likely to be needed in the printing, paper and boxmaking trades.

Various types are made, mobile and static, and it would not be far from the truth to say that height, angle, length, width and breadth present no difficulty in erecting one of these useful conveyors in any size of factory. The Motaveyor by the same firm is yet another piece of equipment, built in various types with all units interchangeable. An assembly consists of Motaveyor units, stands, couplers and one or more driving cabinets according to length, capacity and gradients. The size of plant and its possible growth will, of

course, determine the plant installed; and most manufacturing plants must have some kind of conveyor, fixed or mobile.

The growing needs of industry must be carefully considered in the light of time, labour and like costs, and damage to products brought about by manhandling. Looking at the subject in this light, the matter is one of some urgency.

Some Necessary Precautions

It is only right and proper that attention be drawn to certain precautions to be taken in the working of the various pieces of equipment outlined in this chapter. These are essential to the safe working, the efficient performances and long life of the appliance concerned.

The capabilities and limitations of each type of equipment should be known not only to company executives but to every plant employee using every piece of such materials handling equipment and they should never be exceeded whatever the emergency may be.

Proper maintenance is essential and as much preventive maintenance as possible for materials handling equipment. The employee should be taught to make quick visual checks every time each piece of equipment is used, to be certain that safety factors are present. Good procedure is to furnish each operator with a list of items for a daily check up before he starts using the equipment.

Materials handling equipment should be subjected periodically to a complete examination of working parts. Usually this should be done at least once a week and even oftener where heavy use (and sometimes overload use) has been made in the plant.

Hand trucks of various types used in handling materials are the cause of many accidents. Reasons: the wrong truck in use, weak construction or poor repair, poor floor conditions and insufficient aisle space where used, careless loading and unloading practice.

An American insurance society has proposed these rules for handling mechanical equipment;

1. No riders should ever be allowed; trucks are not made for that purpose.
2. Be sure that the load is set so that it will not slide or roll off.
3. With a heavy load or unwieldy truck ask for help; don't strain yourself.
4. Avoid 'horse play' with trucks; don't hop rides on empties.
5. Wear safety shoes when using trucks of any kind.
6. Trucks not in use should be kept out of passageways.
7. Give warning when you approach blind corners.
8. Never use a truck with broken wheels or damaged handles.
9. Always keep the axles greased.

Here are some safety suggestions for use of power industrial trucks as developed by the Elwell-Parker Electric Co.:

1. Move control levers firmly from one speed to another and without hesitation.

2. Keep your load as low as possible when moving; avoid tipping over this way.
3. Keep your truck behind the load, for if you should fall off the load will be moving away from you. On steep inclines it is sometimes better to reverse this position.
4. Avoid making quick or jerky stops.
5. If the truck has a tilting device, use it. The tilt will avoid spilling the load when rounding corners.
6. Go easy when approaching danger points such as elevator gates, pits, bridges, inclines, tracks, tunnels, etc.
7. Be sure to pick up every load squarely for then there is less danger of the load shifting due to offside loading while travelling.
8. Inspect your load carefully before you pick it up and if you have to move a doubtful load, slow down.
9. Report rubbish on the floors as soon as you spot it.

A materials handling hazard which receives far too little attention is the condition of floor surfaces over which any type of such equipment is used. Such floor surfaces should receive constant inspection to make certain they are even, free from holes, pits and sudden changes in elevation. Not only will such conditions cause loads to fall but they will also make it easy for operators to lose control of their equipment.

Approved operating methods and training programmes are well worth the time and trouble it takes to instil them into employees. They must have proper instructions and be made aware of the danger of certain operations and situations present in materials handling that are not so important on other jobs where the men may have worked before.

The Storage and Handling of Paper and Board Supplies

The packager and the bulk merchandise packer in the food and beverage industries uses considerable quantities of paper both plain and printed, in sheets and rolls, printed labels, wrappings, packaging papers, lining materials, corrugated and fibreboard wads, pads, cushioning materials, and collapsed packing cases, all of which have to be kept in store until required in the process of manufacture, filling, labelling, packaging or packing the product. The following notes in tabloid form will be of assistance to store keepers and those handling these valuable raw materials:

1. Manhandle paper supplies as little as possible.
2. Avoid dropping reams, reels or bundles and see that the corners and edges of parcels are secure.
3. Avoid extremes of heat or cold in place of paper storage.
4. Store away supplies in original wrappers until required. Some papers are sent in in battens and waterproof wrappings and these act as a barrier in the case of coated and special types of paper.
5. Allow new paper received to relax and mature and test paper where possible for relative humidity.

6. Avoid dropping when lifting paper and use old stocks before new arrivals.
7. Keep the warehouse clean and free from dirt and avoid dirty hands when handling unwrapped materials. Waterproof or pitched lined krafts may be used to cover stone floors where other methods of storage are not available

Storage and Handling of Multiwall Paper Bags

Some reference should be made to this form of packaging and packing particularly as it is now claimed that multiwall paper sacks and bags will stack some 50 units in height.

This practical method of packing has replaced, in some instances, the use of metal drums, wooden cases, hessian bags, and other types of bags, crates and boxes. The subject of their storage and handling may be a question of consideration in some sections of the food and allied industries, where powders, granular or crystalline products, foodstuffs, vegetables, and animal feedingstuffs are being put up in this form. The merchandise may be either hygroscopic or non-hygroscopic.

The 56 lb. paper sack has almost become a standard size and is generally accepted in many trades as a unit for ease of handling. It is probably generally known that the Ministry of Agriculture and certain trade unions support the use of a standard weight sack; the smaller and lighter weight of the paper sack has much to commend itself and is regarded as important in that legislation may result in stipulating maximum sack loads at any rate in the agricultural industry. Multiwall paper sacks and bags store away well or may be conveyed to wherever they may be required, packed on wood or metal type pallets. Stacked in 50's high, the stack itself may comprise of several hundred tons. The danger of palletized paper sacks slipping or moving from the stack may be minimized and the general handling of such facilitated by the provision of an outer ply liner of crêped kraft which, for reasons of its rough surface, resists any kind of movement. It is also interesting to note here that suitable paper sacks will resist conditions of frost and cold damp thus rendering them ideal for certain types of foodstuff storage.

New Materials Handling Techniques

Introduced by Tool Treatments (Chemicals) Ltd., of West Bromwich, the new Mini-Bogie presents a speedy and easy method of manhandling a wide range of merchandise within the factory itself, besides which, it is claimed, the method is economical. The large high-density rigid polythene container size 18 in. by 15 in. by 13½ in. is mounted on a transporter which may be easily pulled along the straight or swivelled round on its own axis in order to negotiate the most awkward space. The container, being made of polythene, is ideally suitable as a container and carrier for chemicals and corrosive materials or other products that can be easily contaminated and is also suitable for the food trade.

Hand Stacking and Trucking

In small to medium sized plants, and for less involved stacking problems and lighter loads, there are various new

types of hand-operated stacking and lifting devices. These are not the same as what are termed pedestrian controlled fork lift trucks which are operated by some form of power; the hand stacker while being stabilized by means of forward-projecting wheeled or roller mounted out-riggers. In the case of the fork lift truck, these are made stable by counter-balance weights built into the rear quarters of the equipment. Up to some 15 cwt. may be lifted by hand stackers but straddle stackers are available for heavier loads. These incorporate such features as outriggers similar to hand stackers, and are equipped with powered traction somewhat similar to the fork lift truck. They are however much lighter in weight and for this reason, they may be used on light wood floors and in upper warehouse storage. Where manoeuvrability of load in a confined space is important, or where the floor medium or arrangement in the warehouse has its limitations, hand trucking devices may be considered. For the small and frequent load and where powered equipment may be out of the question, the hand propelled device may be taken into the scheme of storage and conveyance.

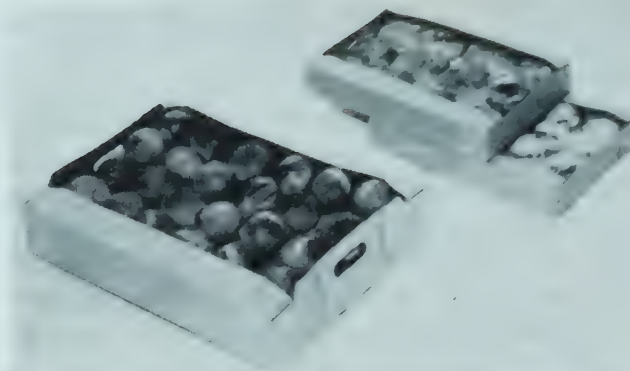
In recent years, new types of standard trucks of all kinds have become available for handling cases, drums, barrels, carboys, and all the new types of unit containers now used in the foodstuffs and allied industries in both bulk form and unit presentation container in packed form. Special fitments are also available on some forms of trucks to cope with the problem of conveyance up and down stairways and along narrow passages. Hand trucks may be classified into two-wheel or four-wheel types.

Folding Hand Trucks

A new light weight hand type truck which is capable of carrying loads of one hundred weight and more, is made to fold up into a convenient unit only 4 in. thick for the purpose of its convenient storage. This unit truck is ideal for use in confined storage space or for self transport in the delivery van for the purpose of aiding deliveries. Made from canvas and light steel sections, it is to be marketed by Packman Machinery (a subsidiary of Baker Perkins Limited). The truck is secured in the operating and folding positions by a simple lock screw. Only a few seconds is required to release the screw and to fold up the end flap and side sections and to twist the truck handles into line with the canvas back. This new open pack-flat truck which closes down into so compact a unit should make an appeal to the despatch section handling a large variety of comparatively small deliveries of approximately 1 cwt. in volume.

New Pallet Loader for Sugar Stacking

A new piece of equipment claimed to stack sugar at the rate of 40 parcels per minute has been produced by Rose Bros., having been under test at Tate & Lyle Limited, where more than 10 thousand tons of parcelled sugar have been



Fibreboard trays that can be made to suit specific track sizes in bakers' delivery vans have been developed by R. H. Filmer Ltd. These trays, supplied flat to save storage space, are an economical substitute for the traditional wooden tray—side flanges provide firm seating while interlocking lugs at each end prevent sliding in transit.

handled. Its capacity of 28 lb. paper parcels can be palletized turning out one ton loads every two minutes. This British designed machine is semi-automatic needing only one operator, but a fully automatic version is to appear shortly on the market. It is claimed by the makers of this pallet loader that it is more compact and faster and the cost is reasonable.

Units are normally built for specific applications but the standard operating limits may be taken as maxima of 42 in. by 52 in. for pallet size 72 in. for load height and 3,000 lb. for load weight. In addition it can handle any type of package that can be securely stacked by hand and moved by gravity conveyor. Tests have ranged from packed fibreboard cases to sacks of chicken food at a top speed of 35 to 40 units per minute.

Multi-head Checkweighing Machine for Cans (Hy-Tra-Lec)

What is claimed to be a new high speed check weighing machine was shown at a recent Packaging Exhibition. This machine is designed to provide high end flow rates for packagers of canned products and is manufactured by Industrial Products (Speco) Ltd. It is said that this machine is one of a range introduced by this firm to meet the ever growing requirements of production speeds. The firm have in the past marketed the well-known 'Streamline' and 'Crossbow' models.

There are four weighing heads fed from the standard single belt conveyor, and the machine checks four cans simultaneously before segregating correct and underweight cans and despatching them on to either of two take-away conveyors.

Four models are being produced with weight ranges of 1 to 4 oz.; 4 to 12 oz.; 8 to 18 oz.; and 14 to 32 oz. Each head will operate at up to 45 minutes, giving a maximum total output of 180 a minute. Power is supplied from the standard 230 V c/s A.C. main, moving parts being driven by a $\frac{1}{4}$ h.p. motor. Floor space occupied is only 5 ft. by 3 ft.

CHAPTER 16

Advertising Methods and Mediums

IN the case of most packaged products full advantage is taken of the free space on wrappers, cans, the faces of cartons, labels, tags, seals, sealing materials, tapes and other packaging materials for the reproduction of illustrations and letterpress in colour. Even plain kraft wrappings may carry an advertising message and may thus be used as a travelling salesman for the packaged product. Full advantage is also taken of the blank space on packing cases, the fibreboard container, cartons and other units where a message may be suitably imprinted in design and letterpress.

Here is a brief survey of the mediums, materials and methods which the packager may use without very much extra cost, to convey some message, hints on product usage or application, details of other products in a range and other useful information.

Recipes and Hints re Usage

The housewife or the consumer of the product, the chef or the cook, the party organizer or the hostess appreciate hints concerning the serving of certain kinds of food and beverage products. A new way of serving the food or drink in conjunction with some suitable additive, can help to stimulate interest in the product, particularly in the case of the fancy food or drink for the party beverage.

Some packagers enclose recipe hints and methods of serving. Cocktail recipes and hints are perhaps one of the outstanding examples of useful information imparted to the consumer via the label, the insert in the package or by a suitably printed leaflet. Soups of various brands carry recipe hints and methods of serving with percentages of water etc., and this service could be extended to a much wider range of food and drink products.

As first class examples of suggestions printed on food packs for recipes which could be usefully extended in many instances, the following may be mentioned:

1. The current Brown & Polson Patent Cornflour pack gives many recipes on serving in five minutes the quickest and hottest milk pudding. 'How good cooks use cornflour nowadays' is a slogan aptly applied in this instance as several first class recipes are printed on the attractive carton under the heading of 'a melt in the mouth texture in baking'. Recipes for cakes, buns, biscuits, short crust pastry and shortbread are all outlined in detail. Cornflour recipes for cream puddings, how to make blancmange and sweet sauces are all included in the useful list of hints and

recipes. Under the caption of 'melting moments' other cake recipes with a difference are outlined. Hints re the measure of quantities, mixing and water application are also provided which help to thicken and enrich gravies, stews and soups. 'Add the flavour with savoury sauce' is yet another service which is, without doubt, fully appreciated by the harassed cook. Hints and recipes of this kind should be printed bilingually where the product is exported overseas if they are to gain their full impact upon the overseas importer and the consumer. According to food and allied product statistics, there is room for more and more British food and drink products and this service in the local language, in addition to English, could help in the general expansion of overseas trade.

2. Another example of first class hints and recipe detail is given on the Avery Egg Macaroni Noodles package. Useful and attractive suggestions for serving recipes are fully outlined on the side of the package in simple words. Recipes for both sweet and savoury dishes are given with times and methods of serving. Hints concerning the preparation of baked cream noodles with the necessary additives are given for serving one or more persons and the method of application in soups and stews is also fully listed.

3. The Quaker Quick Macaroni, ready in a few minutes—package, also carries printed matter regarding ways and means of making a quick macaroni omelet down to the everyday simple macaroni milk puddings. This package also carries with it an offer which helps to stimulate sales.

4. Simple and concise recipes are provided by Dubonnet in the form of an additional label which describes 'How to drink Dubonnet'. Quantities, additives, or mixtures, icing hints are all included in the label. Martini outlines by the means of an additional label how to serve Vermouth as a straight drink and other methods of chilling and serving. All this information is valuable to the new consumers who have never before sampled the food or drink. Recipes and hints, therefore, printed on the label or on the package or inserted as a separate leaflet in the pack are most valuable in the chain of product selling and package presentation.

Poster and Trading Stamps

Trading stamps, metal tokens and other mediums of recording sales or purchase values of food and allied products are used to a limited extent in this country, but overseas the rebate stamp is very popular indeed, particularly in most European Countries. Stamps in suitable

style, colour and denomination are given by the retailer to the purchaser representing the amount of cash spent in the store. Books are provided so that the rebate stamp may be affixed therein and when a certain face value has been collected the book is handed in for a gift or a cash rebate. There may be no special merits in this form of trading, but it does stimulate interest in a specific product or a store as, in most cases, stores are grouped together covering a range of similar products, all issuing a series of stamps for purchases which may be ultimately exchanged within the organized groups of stores.

The poster stamp, however, is somewhat different from the rebate cash stamp as it is not designed to carry any kinds of award in cash or gift, but merely given out by the retailer or inserted in the package with a view to stimulating interest in the product or group of products. Colourful poster stamps can help to foster the collector instinct where they are printed and inserted in series form, in much the same way as the cigarette card of past days. Poster stamps may be designed to carry a series of hints, recipes, details of other products in the manufacturer's range, new packs, processes of manufacture and the raw material used therein and other interesting details which have a relationship to the product or the method of usage.

Poster Stamps Used in the Package

Printed poster stamps may be inserted in the pack, incorporated in the wrapper or carton, and perforated so that they may be torn away by the collector; handed out by the retailer at the point of sale of the product, tipped on to sales promotion matter, business stationery, price lists or catalogues, affixed to the back of the wallet, satchel, envelopes or similar types of package, and in many other ways where the distribution may be free of added cost.

There is no doubt that poster stamp collecting clubs exist in this country so that the collector public are always on the look-out for new series for their collection. Old varieties are said to be very valuable and some poster stamps of antiquity are insured for considerable sums of money. The collector instinct can best be fostered by the introduction of a complete series and this should be borne in mind by those packagers who contemplate the introduction of the poster stamp. They may also be used to announce a new product to the range, as a sales aid for the retailer or distributor, and in many other ways designed to help the sale of the product by this wider and inexpensive form of advertising.

Most packagers have seen the poster stamp in action, selling travel, political and religious propaganda, the trade exhibition, and in more recent years, they have been produced by Trade Associations in connection with 'Eat more of this . . .' or 'Drink more of that . ..'. Indeed, many wide-spread campaigns sponsored by the food and drink trades have included the colourful printed poster stamp in the fully planned advertising campaign.

Here again, where products are exported overseas to countries speaking languages other than English, the appropriate caption should be printed in the local tongue.

The poster stamp is small and many may be produced at a relatively small cost and their distribution is invariably free via the pack and the area they cover can be world-wide. By their use, the packager's message can be carried into the homes and minds of the consumer for all to see and studied at leisure when the poster stamp collection is produced for visitors to study.

Methods of Distribution.—Here are the main forms of distribution:

(a) They may be included in the package or carton where suitable with the goods in the form of hints, recipe items, or goodwill messages or information of other products in the manufacturer's series.

(b) As mentioned above, they may be incorporated in the packaging or wrapping material or on the carton itself being suitably perforated so that they may be neatly torn away. The collector, however, appears to favour the poster stamp with perforated edges, printed on good quality gummed paper for the purpose of affixing to his collection.

(c) Printed poster stamps produced on adhesive paper may be tipped on to the pack, so that they may be easily removed after the purchase of the goods. In some cases, the retailer has been encouraged to distribute poster stamps over the counter to those who make application; such stamps should be well designed and printed.

(d) Where the manufacturer or the merchant advertises his product via the trade magazine, the colourful poster stamp may be tipped on to the space thus converting black and white into a coloured advertisement. Most trade journal publishers will undertake this service in connection with space advertising by arrangement.

(e) Wine lists, menus, catalogues, price lists, window stickers, posters, showcards, brochures, used in the restaurant, café, hotel, on the shop window, may be so designed to carry the colourful piece merely by affixing in a suitable position. This creates immediate attention to the food or drink so advertised without any extra cost in the appropriation.

(f) Manufacturer's representatives may affix them to their visiting cards and special personal stamps have been designed with portraits and illustrations of the product. Histories and centenaries may be announced in this form of advertising and other important developments in the trading of the manufacturer and his products.

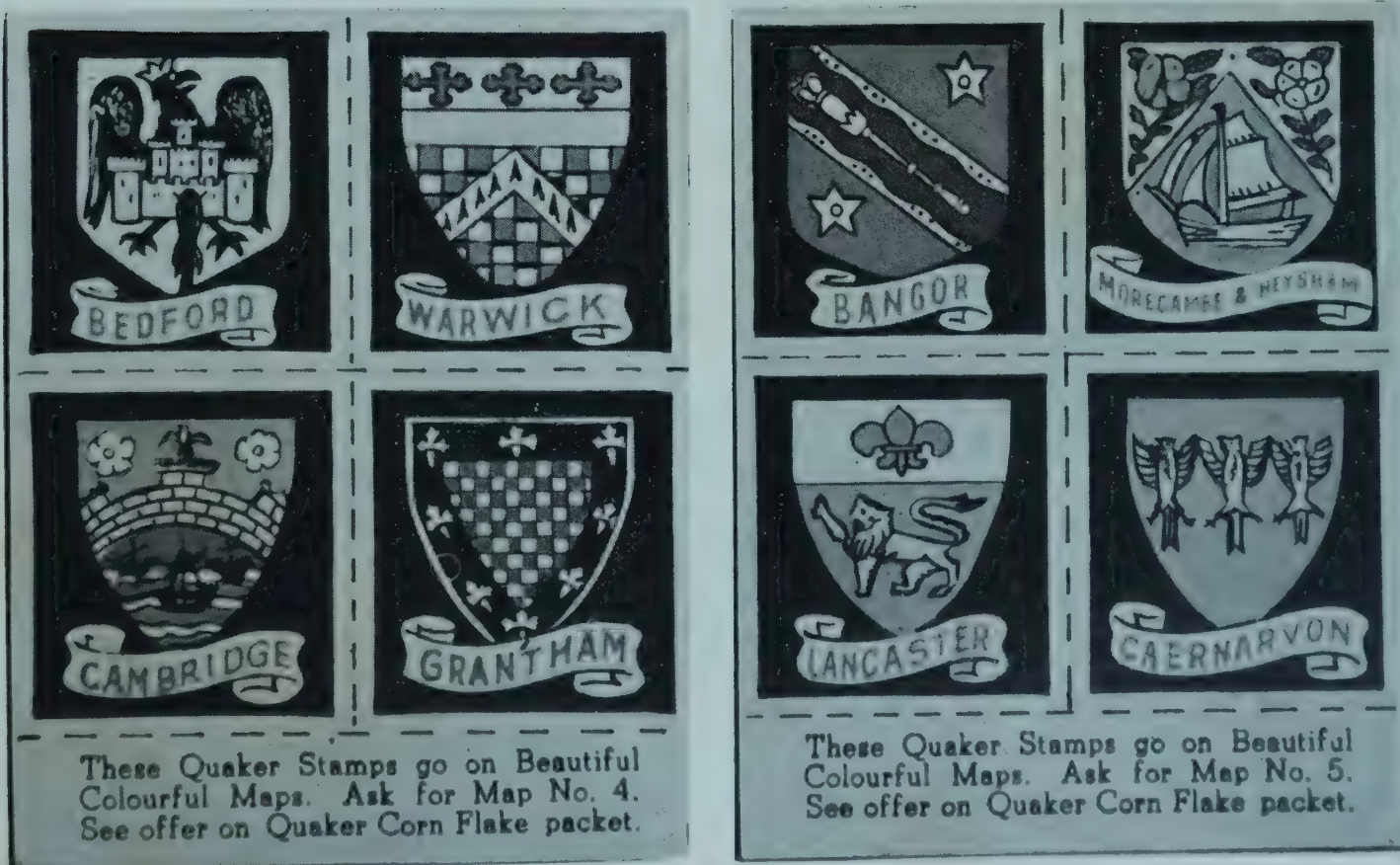
(g) They may be affixed to parcels, packages, bales, cartons and other bulk merchandise sent by rail, road or sea. This form of application helps to spread a message far and wide at no extra cost.

There are other means of usage which can best be determined by the user himself but in most cases, where it is planned to interest and stimulate collector appeal, the production of a suitable simple album should be borne in mind for the purpose of assembling the complete series in the collection.

Design and Application in Usage.—A picture is worth a thousand words and this is very true of the poster stamp



Decorative series of poster stamps designed to popularize packaged goods via the collector's habit.



which is really a poster in miniature. Not too much letterpress as it will be so small that it will be hardly legible. The stamp should be well designed and printed in colour the size of the stamp being approximately 2 in. by 1½ in. preferably with perforated edges. Specialist printers are able to produce some first class designs which may be planned to incorporate trade or brand marks, trading slogans of the manufacturer, his service or the series of products packaged for the market. A good standard should be the aim so that the collector interest is aroused and those which incorporate some form of educational tie up could well be presented to local schools for distribution and general interest thus stimulating interest in the product by the younger generation who can influence their parents as a result of learning something about a brand or a product.

Some Recent Poster Stamp Schemes.—Illustrated are some examples of a series of the Quaker Oats poster stamp scheme wherein this firm of breakfast cereal manufacturers produced a fully comprehensive and colourful series designed and styled to depict Civic Arms of Boroughs throughout the United Kingdom. This delightful series was produced in full colour in authentic designs and were inserted in the packs of the breakfast cereal. They proved to be so popular that the housewife began to ask for the pack with the poster stamp. A suitable collector's album was provided for the complete collection and this was distributed by the retailer. It is claimed that thousands of albums were completed over a relatively short time with the full collection of Civic Arms stamps, the album itself being designed in the form of a folded map, the appropriate



Examples of printed drip mats.

Borough stamps being affixed in position. The offer was appropriately announced on Quaker Corn Flakes packet so that the widest publicity was given to the scheme without very much extra packaging cost.

The 'Drink More Beer' campaign in recent years was amply supported by the production and application of a suitable pictorial series of poster stamps designed to foster interest in beer of all brands in the scheme, the idea being sponsored by the appropriate Trade Association.

Poster stamps may be inserted inside the package or they may be applied to the outside surface of the carton, package or container. Suitable hand and electric labellers with moisture properties may be used to moisten the stamp and assist in the speedy application of the gummed or adhesive poster stamp generally.

Advertising Drip Mats

Table and drip mats provide a very forceful form of advertising food and drink products and suitably placed on the hotel restaurant, café and dining table, they carry an illustrated message right into the minds of the consumer at a time when one is in the mood to be sold, with a brand or a special food or drink. Made from white wood pulp, cellulose wadding, and other bulky material, they may be designed and printed in any style. Wine glass drip covers, which may be pocketed to hold the base of the wine glass are another application of the drip mat. All these items are made in attractive colours, styles, designs and shapes and a wide range of ideas may be obtained and patterns formulated by contact with the producer of this outstanding form of consumer advertising at the point of public eating or drinking. Some outstanding examples of shape and colourful designing in all forms of drip mats are seen on the continent and those packagers or advertisers who





Serviettes carrying advertising matter.

contemplate this form of appeal for the product, would do well to study current examples of such items.

Illustrated are a recent series of wine, spirit and beer drip mats produced by Bulmer's Cider. Here again, a series showing 'The Stars and You' covering every phase of astronomy for the interest of all cannot fail to focus attention on the beverage so depicted in the drip mat series. Here is a series worthy of the general collector interest and the Bulmer people say that many of their patrons have written for a collector series. Drip mats in their various forms and styles, made from all kinds of wood pulp and wadding, are worthy of consideration by the appropriate food or drink manufacturer.

Serviettes

Serviettes are mass produced from white and coloured tissue of suitable strength, embossed and printed with design, and they may also be printed to specification. They have a special application in the food and beverage industries where they may be used on the table in hotels and restaurants, spreading the advertiser's message everywhere. Illustrated are some examples of uses and application in the coffee, food catering and beer trades. Special designs may be obtained by arrangement and the cost is not too high. Printed serviettes may be distributed in the packing case or container when food or drink is delivered.

Paper lace doyleys may also be printed with a sales message or an illustration of product or a service. The doyley as made today has every resemblance to the genuine fabric piece and many designs which bear faithful reproduction of Maltese, Nottingham, Brussels and other famous lace patterns, may be obtained in white or coloured. Both the serviette and the doyley have an application to the party or the special occasion or festive season of the year and patterns may be chosen to taste and appropriate to the trade.

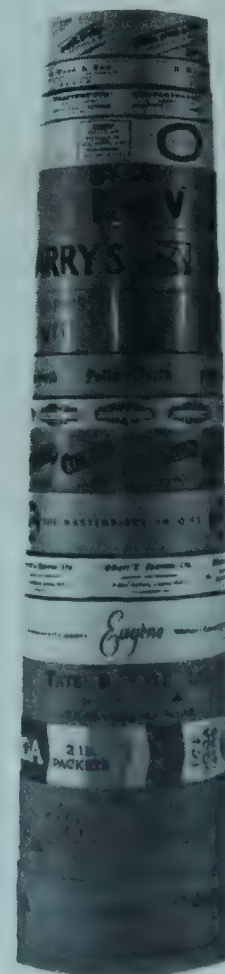
Advertising Tapes

Printed Tapes for Sealing Unit Packages.—Printed adhesive tapes may be broken down into two main types and forms of usage or application one being for the purpose of

sealing the carton or can and the other for the use of bulk packing of the product in kraft wrapping and this usually entails printed gummed kraft tapes coated with animal glues.

Self-adhesive or pressure sensitive tapes are made in colourless or white and several colours and they may be printed with individual designs in up to four colours. Machines are made to apply these tapes to lids of cans, flaps and tops of cartons or cases. No moisture is required in its application. Colour harmony is important and the best colour should be chosen to contrast or combine with the product sealed or enclosed by these tapes. Messages, trading slogans, trade marks, brand names, designs and so forth may be printed by arrangement and this is a most potent form of advertising and sealing the product in the one operation.

Glued kraft tapes are made in brown and several colours and have great strength, the quality of the best grades being made according to specification and standards of strength laid down by the appropriate trade organizations, or the B.S.I. Several colours and special designs may be printed as specified and such tapes are used for sealing corrugated fibreboard packing cases, containers, cartons and boxes of all kinds. Bulk packed merchandise may be sealed with printed glued kraft tape. Both forms of tape are first class advertising mediums and may be considered as free advertising mediums as they take care of the blank space readily available on all containers and packages. Cellulose tying tape may also be printed and these have an application in the presentation of the fancy goods or food package make up.



Printed glued kraft packing tapes.

Signature papers with a message.



Printed Wrappings

Yet another form of advertising may be found in the wrapping or packaging paper itself, such materials being described as signature papers. Manufacturer's or packager's name, trade mark or message may be suitably arranged in the form of a pattern and printed in colour on any background paper or kraft wrapping. This form of wrapping both encloses or wraps and advertises the product while on sale or display. The pattern is purely individual and is used only by the packager and for his products alone. After the initial cost of the plates or rubbers from which the paper is printed either in the flat sheet or on the continuous reel, repeat orders cost little or no extra as compared with stock printed and designed fancy wrappings.

Carrying the Goods Home

Many outstanding new designs have been recently seen whereby the kraft carrier bag has been converted into a novel unit capable of safely carrying home the goods purchased in the shop and store and, at the same time, serving as a shopping reminder. A printed list of reminders on the side of the bag is an important form of advertising. The shopper must have a reliable carrier bag which ensures that the purchases are brought safely home without loss or breakage as a result of any frailty of the carrier bag. Standards of strength are laid down for kraft and suitable materials should be used in their manufacture.

The carry home poultry or turkey carton is becoming popular in this country. Hitherto poultry, which makes up into awkward and heavy packages when wrapped in ordinary greaseproof material, presented some problems and meant wasted time in wrapping the purchase, but today, the introduction of the new 'carry-home' pack made

up from strong fibreboard corrugated materials, ensures that the poultry is carried home safely and easily. Several varieties of these carrying containers are now made by the large makers of fibreboard packing cases, being made up from one piece of corrugated fibreboard, cut and blanked to give a very convenient carrying handle. The pack is printed to specification and suitably stitched on one side only for the purpose of assembly. The bottom is stitched and the top formed with self-locking flaps and slots which are quickly put together at the point of sale.

Both the kraft bag carrier and the new poultry or turkey carrier are ready means of printing an advertising message and every advantage may be made of blank space which is available on all sides of the container. While many retailers still employ makeshift wrappings and often no wrapping whatsoever, something must be done to spread the message of the packager himself. This surely means that there is a very large potential market which may be used for the purpose of further advertising products of all kinds and developing new business.

Bags, Wallets and Satchels

Many high class and fancy food products are packaged in some form of attractive bag or wallet and most of these are printed with a suitable message. Bags and similar items are made from all kinds of materials, plain and fancy. Where strength is required machine glazed and unglazed pure krafts are best. Machine glazed bleached krafts and machine glazed sulphites are also used in the production of strong bags and paper sacks. Good bag styling may now be seen, the finished product having some regard to the trade and the usage. All these bags may be printed in one or more colours with design and trading message. The

manufacturers of these types of bags are able to provide a first class service in design and bag shape and place their experience at the disposal of the packager. All kinds of wrapping or packaging material used at any stage of display or point of sale may be appropriately printed by arrangement.

Progress continues in the whole field of produce pre-packaging; whereas product presentation was once in the hands of a few pioneers with progressive packaging ideas, knowledge and experience has now been pooled so that lessons learned and current technicalities which have become apparent as a result of experience, are available and ready to be shared by all concerned for the better presentation of goods. Advisory bodies, trade associations, P.A.T.R.A., the B.S.I. are now taking a prominent part in the formulation of methods and materials designed to protect and present the product in a better form from every standpoint; advertising may be considered among the general march of progress.

Sorter's or Packer's Slips

In many types of food and allied packs, the sorter's or packer's slip is enclosed with the carton or the box. These slips usually bear the code and initial of the packer so that complaints may be traced to the individual packer. These slips are associated with the prepackaging of confectionery, chocolates and high class or fancy food products. There is no reason why a perforated piece may not be included with the slip in the form of a poster stamp thus affording the opportunity of inserting an advertising piece with the essential packer's slip. Packer's slips with poster or trading stamps attached may well be designed to portray processes of manufactures, sources or raw materials used in the make up of the product, other products in the series and other educational items of national and local interest. Inspection slips, coupons of various kinds, complaint slips and similar printed matter may well be accompanied by some form of illustrated advertising matter calling attention to quality, brand or other goods available from the same maker.

Showcards, Showstands and Displays

Some kind of attractive unit or showcard designed to take up the minimum amount of space is often acceptable to the retailer with window or counter space available to display the product together with the printed word in pictorial form. First class cut outs are now specially designed and prepared by the specialist for various kinds of food and beverage products. These units may be packed in with the goods in the fibreboard packing case or container. They should not be so complicated but fashioned in such a simple way that they are quickly assembled ready to serve as a background for the displayed product. Folded and score lined display units are best as in these days of labour shortage and pressure, speed of assembly is the essence of the display piece.

Paper sculpture now plays a leading part in display work and many fine examples may be seen in the shop window and store. They are clean and attractive and cost little.

These are made up to specification by the specialist in this art. Metal lined boards, granulated showcards and material, all have a display value and may be considered where appropriate. Metal-lined board is made in gold, aluminium and several bright colours in matt, bright and brushed finishes. Most grades of metal-lined board are lacquered, are non-corrosive and possess a surface that is capable of printing by silk screen, letterpress and lithographic processes. They may be printed in many colours, the boards themselves being capable of scoring, folding and punching out to shape, so that such display refinements as wings, steps and moulding may be carried out by the showcard and showstand specialist. Good bold lettering is essential as the brand and message must be capable of being seen and read in a flash by the passer-by who briefly scans the shop window.

The third dimension is important and skilled folding and scoring can produce some first class examples of three dimensional presentation by the application of curves or moulding.

As is now the case with the delivery of the packing case, units of this kind should be specially 'packed flat' so that they may in turn be sent out to the distributor or retailer flat with little inconvenience. The unit is actually built up around the food or beverage container, one or more units being used in the display. This brings in the use of steps or a single platform.

Stylist shape, good designing and bold execution will ensure that the display is given a front place in the window or on the counter of the retailer. Where possible, some kind of movement may be incorporated in the display piece, but it should be attractively planned and have some relationship to the product. Movement for movement sake is not the answer to this form of window display. Animation may be quite simply obtained or can be costly or complicated. The question of cost and the product will decide the form of display.

Considerable use is being made of lampshade parchment often printed by silk screen process in bright colour design, the finished lampshade being made to revolve as a result of the heat supplied from an electric light bulb. Any message may become animated in this way at a very small operational cost. Patent flashers, motors and other electrical units may be incorporated in the more elaborate display stand such as may form part of a unit for an exhibition, trade show or for use in a large and important store.

Where really expensive units are supplied to the distributor of the product, the question of service or repair may have to be considered. There is nothing more irritating to the display manager in the shop or store than a large piece of equipment that will not function properly, or which continually goes wrong or is costly to maintain. There are several standard and established forms of display units which continue to serve the purpose of animation, such as the running water tap, puzzle mirrors with a double message or picture, running liquids supported by a fountain arrangement and many other subtle display pieces, all of which may be obtained from stock or re-styled to suit the

needs and the appeal of the product to be displayed alongside the unit. Film slides, animated pictures and messages based upon a television presentation are yet another form of animated display.

A study of London or the big cities in the United Kingdom will also reveal some very attractive and modern forms of cartoon figure display units.

The Merchandising Display Unit.—This comparatively recent addition to display involves the use of solid colour fibreboard material, with first class surface finish capable of taking colour printing in the form of sales messages and really attractive designs. These units are illustrated in Chapter 8. A wide variety of shapes, styles may be now produced as a result of skilled die-cutting and both rigid and collapsible types are now in use. Popularly used for packing unit containers such as cartons, cans, drums, bottles, caskets and the like, they may be used by the retailer for direct display and units from which the product may be sold. Upon opening up these merchandising display units, flaps are folded back and interlocked in most instances and the unit is ready for immediate display and selling. Other units in this field include various forms of display outers and counter display stands.

Corrugated Display Materials.—The best and finest fluting finished corrugated material may be used for all kinds of background displays in the shop window and store. Such material is pliable and easily moulded, cut and shaped to fit into any scheme of window display. Columns, pillars, curtains, drapes, cones and other interesting shapes may be obtained from this material. Metal papers are also laminated to the best grades of corrugated material so that they may be used for exhibition work and display generally. The more recent progress made in multicolour printing by various processes to either the single or double fluted corrugated material, based on metal-lined laminates, affords an opportunity of using a strong and pliable material for display work which is far easier to handle than crêpe and other plastic materials.

Display for Food and Beverage Bottled Products.—Space will always be the deciding factor in the type or form of display to be adopted for bottled or canned beverages and foodstuffs. Where room is available either as floor, counter or window space, the mass display is often very attractive and probably the more suitable form of product presentation. It is here that the true effect of the pack and its label reveals itself. Label design should be such that the product displays well as a unit or when displayed in mass formation so that a pleasing pattern of harmonious colour and design is possible. The more attractive or expensive types of products may be best displayed in units or in two's or three's supported by the display unit. In the self-service stores, the display must be so arranged that the consumer is able to select, and carry away the chosen unit without disturbing the rest of the display. Where impulse buying is the order of the day, all factors must be considered and



A display unit for bottled products. Photo courtesy Morey (Barnet) Ltd.

often the added effect of some lighting behind bottles, which show up contents, colour or density of the product, is more impelling than the sponsored display with some kind of sales aid. Here again, the attractive paper based label in all its colour and design will help to make the display more vital. High class wines and spirits are usually well labelled and the retailer is more inclined to give longer and more frequent displays to the well-labelled product than the unattractively turned out product however good the container itself may be. In many instances, the customer is already converted to a brand or quality, but much may be done to foster interest in a new brand by suitably placed displays. The store entrance and the cash desk are some focal points of display that may be considered where new products are involved. New brands may also be displayed and sold via the automatic dispensing machine which invariably operates out of hours. These machines are a first class opportunity of introducing new drinks and foods for the consumer who cannot always shop before the store closes. The waxed paper cup and container have largely assisted in the packaging and automatic sale of many kinds of beverages, fruits and foodstuffs.

Where new brands or products are being displayed and sold, the opportunity may be taken of offering them in a new light and in new display surroundings. For example, the public are quite used to seeing showcards and displays based upon fruit motifs for bottled and canned jams, conserves and the like; hops, barley and similar motifs depicting the make up of beverage products are invariably used to portray drink to the consumer. The sources of raw materials, their history, the travel to the plant converting the raw material into food and beverages, methods of table application and other similar features may well be introduced into the display unit or showcards as opposed to the traditional subjects or themes outlined. A colourful and

attractive cut-out of a grape picker or a fruit grower cannot fail to appeal. An attractive girl study never fails to attract the public wherever the motif may be used and in whatever connection it may be applied.

Showcards and unit displays demand careful thought and originality but they must be related to the product in some way. It must be remembered that the packager's carton and its display is only one of thousands, probably in the same field of manufacture, and the competition for floor space, window or counter facilities can be hotly contested and the retailer holds the final cards. The display must be attention compelling and be outstanding as a silent salesman in place of the assistant who formerly sold the goods.

The Effect of Lighting.—Many forms of lighting react somewhat unkindly to the display piece, particularly the metal-lined display unit and light reflection and the high-lights have to be considered. Advice may be sought at the onset relative to lighting effects upon certain colours, materials and shapes. Distortion by unsuitable lighting can destroy the value of the display.

Attracting the Buying Public.—The effect both on the buying public and the retailer himself from the standpoint of the display must be considered. There is a tendency to mix displays in the shop window and store and this kind of product contrast can help to focus attention on the units so set out. A built-up display of colourful beverages may be relieved by the incorporation of some bottles of cocktail cherries for example and this combination and others create sales impulse. Products that go together may be similarly displayed side by side. Flat surface cartons may be displayed with round cans and this too can create sales appeal and product choice. Much the same may be said about the product label or brand mark. There are so many square and rectangular shaped labels that the label with an unusual shape can command attention at the point of sale. The shaped label has been fully discussed in Chapter 11. Methods of both display and product presentation will have an ever-increasing influence upon the style of label and style of unit container produced, the final display being a dominating factor. Self-service and the super-market all have to be taken into account. The development in the packaging of fruits and vegetables is one example of progress; this form of packaging has been largely dictated by the housewife and the retailer. Market conditions must be studied in the light of modern progress and convenience of living conditions so far as storage in flats and maisonettes is concerned.

Much more remains to be gained by means of on-the-spot research as to what really attracts the shopper and encourages the consumer to make a choice of this or that pack or brand. Practical design and re-styling must take into consideration the new trends if markets are to grow and complete satisfaction is to be achieved both from the distribution of the product and the consumer standpoint.

The Value of the Plastic Pack.—Plastic wraps, window and

transparent containers, satchels and envelopes, may be considered as forms of advertising and displaying the product. An ever growing range of food products is being packaged in this form and in many instances very little else is demanded in the form of display material. Where the contents of the package are fully visible yet protected, little else remains to be done in marketing the product from the display aspect. A suitable showcard may be introduced in some instances. Films for shrink wrapping, polythene containers and cartons, many kinds of sheet or reel filmic material, rubber hydrochloride films (which help the product to breathe), skin packaging in the form of the bubble and the blister, moulded containers from film, satchels and wallets, are all current methods of packaging which also assist in the display of the product. Progress in this field too remains to be developed as continental countries are still ahead of the home front so far as the presentation of solids and liquids in filmic material is concerned.

Many types of films and their associated laminates are available which satisfy the necessary requirements of hygiene. Many suitable laminations of materials await research in order to produce the full array of materials required for all forms of food packaging. It is true to say that the food and allied industries are the largest users of the products of the plastics industry, and it is the packager in this field of product manufacture that awaits future developments with considerable interest.

Beverage Advertising

There is often no limit to which advertising may go and this is particularly true of high class wines and spirits. One of the more recent and outstanding examples of outdoor advertising may be cited in connection with Grants and their 'Stand Fast' Scotch whisky. Three 20 ft. high triangular whisky bottles were shipped on the s.s. 'Alsatia' from Glasgow to New York where they are now displayed on the roofs of outstanding buildings. Each bottle is made of fibre glass and weighs some 350 lb. and if filled to their capacity they would together hold sufficient whisky to provide a whisky drinker with an ordinary size bottle a day for 22 years. The total capacity is said to be 1,333 gallons. In their outstanding positions in New York, the bottles are fully illuminated at night.

Decorated Vans

Perhaps more use could be made of the decorated type of delivery van specially designed with side windows in which to make travelling displays of the product for all to see wherever the van travels in the course of daily deliveries of foods and beverages to the retailer. This form of transport is often seen in continental countries and in addition to display and the delivery of goods, brochures and price lists are available and handed out by the carman to the retailer upon request. In some types of van equipped with loud speaker, cooking demonstrations are also given. The travelling display van has been seen here at home in a limited form but this form of conveying and advertising



products in one operation is worthy of consideration in the case of the nationally advertised product. Travelling showrooms on wheels are other ideas and in this form of conveyance, the retailer is invited to enter the van and study the display on the spot and place orders. Spare stocks are carried where room permits so that spot deliveries may be made of new products. In this age of competition, everything must be done both from the standpoint of packaging and marketing food and drink products calculated to stimulate immediate sales of the product.

Greetings Messages on Bottles—Neck Labels

The famous Danish firm of Tuborg have adopted a very novel form of advertising using neatly printed labels affixed to the necks of their larger beer bottles.

The messages are appropriate to the occasion or season of the year and here are a few examples of current slogans and greetings which are obviously read and enjoyed by drinkers of Tuborg.

'When your customers during the coming weeks start

asking you—and each other—teasing questions as "How high is the leaning tower of Pisa?", then the answer probably will be sought on the neck of the Green Tuborg you have just passed over the desk. The new bottle-neck label with the "Tuborg'gram" is a little summer joke which we hope will delight the public and be of benefit to you by further creating "an atmosphere for Tuborg."

Kindest regards and best wishes for a good summer season.

P.S. On the bottles which will be provided with the new bottle-neck label you will for the present in every case find 8-12 different particulars in "Tuborg'gram style"—a whole encyclopaedia on bottles."

The whole scheme is supported by announcements in the Danish newspaper *Politiken* and attractive albums in cartoon form are given by the distributors and retailers to customers, containing slogans and useful information for the party and special occasions. The following (illustrated above) is an example:

Q. 'Could you tell me when a Tuborg tastes the best?
A. Every time.'

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